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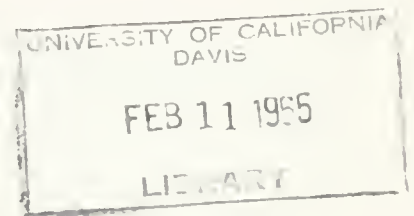


State of California
THE RESOURCES AGENCY
Department of Water Resources

BULLETIN No. 94-4

LAND AND WATER USE IN
SMITH RIVER
HYDROGRAPHIC UNIT

JANUARY 1965



HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

ERRATA SHEET

Bulletin No. 94-4
Land and Water Use in
Smith River Hydrographic Unit

References in Table 8, "Index to Surface Water Diversions",
pp. 44-46, should read as follows:

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C-10	C-14
C-11	C-13
C-13	C-11
C-14	C-15



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FOREWORD

In 1956, the State Legislature declared:

"... that in providing for the full development and utilization of the water resources of this State it is necessary to obtain for consideration by the Legislature and the people, information as to the water which can be made available for exportation from the watersheds in which it originates without depriving those watersheds of water necessary for beneficial use therein ..."

The Department of Water Resources was directed to conduct the necessary investigations to compile this information.

For purpose of these studies, the major drainage areas of the State were delineated. Division of these drainage areas into subareas, designated hydrographic units, was then made. The hydrographic units, which generally comprise watersheds of individual rivers, serve as the basic unit for collection and reporting of data.

The investigation is being conducted in two phases:

- (1) collection and publication of data on land and water use, and
- (2) determination and reporting of water resources and future water requirements. Collection and processing of basic data for both phases, by hydrographic units, is underway in much of the State.

The land and water use and land classification data are being published as the Bulletin No. 94 series, covering individual hydrographic units. These bulletins are distributed in preliminary editions and reviewed at public hearings. Final editions are then published including summaries of the hearings and resulting revisions. These bulletins are an essential source of data for the subsequent water requirements studies, and when complete, will provide detailed data for the entire State.

This report is the fourth of the series and is the final edition of Bulletin No. 94-4 following public hearing held in the Smith River area in December 1963.

The second phase of the investigation begins with an inventory of water resources in each drainage area, including streamflows, ground water, and water quality characteristics. Estimates of future water requirements, based on the land and water use studies and projections of foreseeable future development, are now underway in some areas. Results of these water resources and water requirements studies will be published as Bulletin No. 142 series, each covering some or all of the hydrographic units within a drainage area.

FOREWORD (Continued)

These water resources and future water requirements bulletins will provide the basis for outlining the additional projects needed to meet the State's growing water needs. By interrelating the projected water requirements of all areas of the State with the available local supplies, by decades, a recommended sequence and timing for the State's future water development plans will be established. Besides thus forming the chief basis for the Department of Water Resources' all-important project staging program, the data on water resources and water requirements will be a most valuable guide for water development planning by federal and local, as well as state agencies.

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DEPARTMENT OF WATER RESOURCES

P. O. BOX 388
SACRAMENTO



September 24, 1964

Honorable Edmund G. Brown, Governor,
and Members of the Legislature
of the State of California

Gentlemen:

I have the honor to transmit Bulletin No. 94-4, "Land and Water Use in Smith River Hydrographic Unit," which describes land use, classification of lands, and water use within this hydrographic unit. This report is one of a series of Department of Water Resources reports which will describe similar studies being conducted throughout the State. These studies are being conducted pursuant to legislation sponsored by Senator Edwin J. Regan and codified under Section 232 of the Water Code.

In December 1962 the preliminary edition of this bulletin was released, and in December 1963 its contents were discussed at a public hearing held in Crescent City. Appendix E of the present edition reports upon comments received. Department personnel studied these comments carefully and revised the present edition accordingly.

Bulletins of the No. 94 Series provide information which will be used to estimate the amount of water which can be used beneficially within each area. The amounts of water surplus or deficiency will be determined by comparison of these estimated needs with the local water resources.

Bulletin No. 94-4 will help concerned interests determine future needs for water in the Smith River Hydrographic Unit. In addition to basic data on land and water use, there is included a discussion of the history, natural features, climate, and economy of the unit. Maps of present land use and land classification illustrate the text.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "W. E. Warne", written in a cursive style.

Director

ACKNOWLEDGMENT

The Department of Water Resources gratefully acknowledges information contributed by the numerous water users and residents of the Smith River Hydrographic Unit and various agencies of the federal, state, and local governments.

Special mention is made of the helpful cooperation of Mr. Elmer Dent, Del Norte County Farm Advisor, for his assistance in arranging and conducting a review of information published herein.

While most of the pictures shown in this report were taken by the Department of Water Resources' photographers, special thanks are given to State Division of Beaches and Parks for the use of photographs top page 14 and bottom page 68.

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

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HUGO FISHER, Administrator, The Resources Agency
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-----O-----

WILLIAM M. CARAH
Executive Secretary

ORVILLE L. ABBOTT
Engineer

PUBLIC HEARING
on
Preliminary Edition
of
Bulletin No. 94-4
Land and Water Use in Smith River Hydrographic Unit

In accordance with Section 232 of the Water Code, a public hearing was held on December 11, 1963 to receive comments on the preliminary edition of Bulletin No. 94-4, "Land and Water Use in Smith River Hydrographic Unit." This hearing was held at Crescent City, Del Norte County, for interested parties within the Smith River Hydrographic Unit. Mr. Robert E. Foley, of the Department of Water Resources, conducted the hearing. In attendance were 15 persons, including local water users, representatives of state and local government agencies, and other interested parties.

The Department has conducted further review of the preliminary edition in consideration of the verbal comments received at the hearing, and only minor technical and editorial revisions have been made. Copies of the transcript of the hearing are on file with the Department of Water Resources in Sacramento and are available for review by the public.

Verbal comments were made at the hearing by the following persons:

Mr. William A. Stahlberg, California State Department of
Beaches and Parks, Crescent City
Mr. James J. Yarbrough, Del Norte Triplicate (newspaper)
and Del Norte Chamber of Commerce, Crescent City

No written comments pertaining to this report were received by the Department of Water Resources.

CHAPTER I. INTRODUCTION

This bulletin presents basic data on land and water use in the Smith River watershed and adjacent smaller watersheds. These watersheds are designated herein as the Smith River Hydrographic Unit. The data cover present land and water use, classification of lands, systems used to divert surface water from Smith River and its tributaries and from the smaller adjacent watersheds, histories of diversions, apparent water rights pertinent to each diversion, purpose and extent of use of diversions, seasonal quantities of water diverted during 1958, and an estimate of present consumptive use of water in the unit. A general description and a brief history of the area are also included.

These basic data were gathered during the period 1958-60 in compliance with Chapter 61, Statutes of 1956, as amended by Chapter 2025, Statutes of 1959, and codified in Section 232 of the Water Code of the State of California. This legislation provides for an inventory of water resources and water requirements of the State. This is the fourth of a series of bulletins to be prepared under this authorization. The text of Section 232, with a discussion of its history and implications, is included in this bulletin as Appendix A.

These data will provide the basis for a future determination of the quantities of water reasonably required for future beneficial use within the Smith River Hydrographic Unit. Preliminary estimates have been made and presented in State Water Resources Board Bulletin No. 2, "Water Utilization and Requirements of California."

The final determinations of these water requirements will be based on estimates of: (1) future land use, (2) economic patterns, (3) population, (4) industrial and agricultural development, and (5) recreational needs.

The data presented herein have been reviewed in preliminary form by representatives of Del Norte County, farm advisors, and local water users. These groups submitted changes which were reviewed in the field, and adjustments were made where warranted.

Organization of Report

This bulletin is basically a compilation of data in the form of tables and plates with supplemental explanatory text. The report is divided into five chapters and five appendixes and contains three plates.

Chapter I contains a general description and a brief history of the Smith River Hydrographic Unit. Chapter II presents data on surface water diversion systems including location, ownership, water use, related water rights data, history, etc. Chapter III includes a history of land use within the unit and tables of present land use. Maps relating to Chapters II and III and showing the areas of various present land uses and the locations of diversion systems are included as Plate 2. Chapter IV includes a tabulation of lands classified with regard to their potential for irrigated agriculture and for recreational purposes. Maps relating to this chapter and showing the major categories of land class constitute Plate 3. Chapter V summarizes the report.

Appendix A presents the text of Section 232 of the California Water Code and a discussion of the pertinent responsibilities and work program of the Department of Water Resources. Appendix B is a bibliography of publications pertinent to the unit and references used for this report. Appendix C presents a short summary of California water law and a tabulation of applications to appropriate water in the unit. Appendix D presents details of two diversions which could not be adequately described in the tables in Chapter II. Appendix E presents comments made at the public hearing held December 14, 1963, in regard to the preliminary edition of this report.

General Description of Area

Location

The Smith River Hydrographic Unit consists of 779 square miles of Del Norte County lying northwesterly of the Klamath River watershed, as shown on Plate 1, Location of Unit. The Smith River and its tributaries, rising on the western slope of the Siskiyou Mountains, comprise the primary drainage system of the unit. This unit also includes those portions of the watersheds of the Illinois River and the Winchuck River within California and several small streams which flow directly into the Pacific Ocean between the Smith River and the Klamath River.

The hydrographic unit is bounded on the north by the California-Oregon border, on the east and south by the drainage divide separating the Klamath and Smith Rivers, and on the west by the Pacific Ocean.

For the purpose of this report, the Smith River Hydrographic Unit has been divided into nine subunits. Location of these subunits are shown on Plate 1, and the area of each is shown in Table 1.

TABLE 1
AREAS OF SUBUNITS IN
SMITH RIVER HYDROGRAPHIC UNIT

Subunit	: : In acres	: : In square miles
Illinois River	37,600	59
Middle Fork	101,200	158
Mill Creek	23,500	37
North Fork	43,400	68
Rowdy Creek	20,400	32
Smith River Plain	61,100	95
South Fork	187,200	292
Wilson Creek	12,600	20
Winchuck River	<u>11,600</u>	<u>18</u>
Totals	498,600	779

Redwoods in
Del Norte County



Junction of Smith River
and
South Fork Smith River

Historical and Present Development

"I encamped where there was very little grass and near where the Mountain made a rapid descent to the north rough and ragged with rocks. I went to the brink of the hill and when the fog cleared away for a moment I could see the country to the north extremely mountainous, along the shore of the Ocean those mountains somewhat lower. For all appearances I came to the conclusion I must move in again toward the coast."

Diary of Jedediah Smith, May 28, 1828.

Thus did Jedediah Smith, pathfinder, trapper, first American to travel the overland route across the desert and mountains from the Mississippi to California, describe the country of the Smith River. In May 1828, on his second journey through the uncharted wilderness of what was then Mexico, Smith viewed this area from its southern edge. He was the first American to do so. A few weeks later, he had passed northward through the redwood forest and forded the rushing river which today bears his name.

It was the quest for gold, one of the unit's natural resources, that opened the country of the Smith River to settlement. In 1850, ships searching for a sea approach to the gold fields of the Trinity River explored Crescent Bay. Until then, the coast of this country was almost as unknown as the primitive forests and mountains back of it. Seventy-five years earlier, Spaniards sailing north along the California coast had charted Point St. George, near what is now Crescent City, but apparently had not touched shore. Following this Spanish exploration, ships of several nations began to ply coastal waters from Monterey to Alaska, their crews trading for fur with the Indians along the coast. This fur trade reached its peak in about 1800, but had almost vanished by the late 1840's, when the discovery of gold at Sutter's Mill opened a completely new era of exploration.

Other major commerical endeavors, now prevalent in the hydrographic unit, also had their start in the early formative years of the economic development of the unit. Food required by the miners in their quest for gold was supplied from local farms as early as 1857. The lumber industry began in the early part of 1853, and the first exportation of lumber from Crescent City occurred in 1859. The recreation potential of the area was noted in the 1850's, when a resort was established near the town of Gasquet, which at that time was a stage station on the Smith River wagon route to the inland settlements and mines.

With the spread of mining activities into the northwest corner of California, the natural anchorage at Crescent Bay became a chief shipping and distributing point. In February 1853, surveyors laid out the town site of Crescent City. Within three months, incoming settlers had established a sawmill; and within a year, the population of the area had increased to about 1,000 persons. Crescent City was incorporated in 1854, and became the county seat in 1857 when Del Norte County was formed from the since-dissolved Klamath County. From March through May of that year, 1,717 persons disembarked from ships stopping at the city, and crews unloaded 1,278 tons of freight. Crescent City served the camps and diggings of the gold miners scattered throughout northwest California and southern Oregon.

During the period following the original influx of gold seekers in the 1850's, and continuing until 1890, Crescent City and her environs had a transient population which varied according to the special economic demands for mineral and timber products. The period 1890-1920, however, saw a somewhat static economy supporting a population of about 1,000 people. The next 40 years saw a general growth in the Crescent City area, except during the depression years of the 1930's when the population dwindled from 1,700 to

Lumber
loading,
Crescent
City
Harbor



Fishing
Boats
in
Crescent
City
Harbor



about 1,300 by 1940. With the advent of World War II, the economy of the area began to climb; and the population in and around Crescent City experienced an increase to about 4,500 people in 1950, and to about 9,800 people in 1960.

Since 1920, this same trend has been experienced throughout the entire Smith River Hydrographic Unit. It was estimated that in 1920 there were some 2,300 people in the unit. The 1930 population of 4,100 in the unit decreased to about 4,000 in 1940, and then increased to 6,700 in 1950, and to 15,100 in 1960.

The unit's second largest community, Fort Dick, is located 8 miles north of Crescent City. This community is a scattered, unincorporated area, having its center about one-half mile west of the present U. S. Highway 101, and about a mile south of Smith River. As lumber mills, large dairies, and other industries rose along the coastal plain, Fort Dick grew along the old U. S. Highway 101 and developed into a residential community intermixed with farms and businesses. The impetus of this growth can best be shown by the increase in population as indicated by the 1950 and 1960 census figures, which report a population of about 1,200 for 1950 and about 3,100 for 1960.

Smith River, one of the older towns in the hydrographic unit, is typical of communities affected by the growth of agricultural industry. Like Crescent City, 13 miles to the south, Smith River, which lies at the junction of Dominie and Rowdy Creeks in the northeast portion of the Smith River plain, had its beginning in August 1853, when the first settlers built a few cabins at this site. The town, which chiefly serves a farming area, did not grow as rapidly as Crescent City, and by 1880 consisted only of a store, a hotel, a blacksmith shop, and two dwellings. By 1894, however, it had grown to a hundred homes and business houses, the chief of which housed the Crescent Creamery. The creamery at that time had a daily milk-processing capacity of

about 40,000 pounds. Since that time, the dairy industry has contributed substantially to the economy of Smith River. For some years however, timber products have been the major source of income to the community. The growth of Smith River has been most rapid since World War II, due to the expansion of the lumber industry. This trend is indicated by the increase in population from 900 in 1950 to about 2,000 in 1960.

The community of Gasquet, which dates back to the 1850's when it was a stage station and holstery on the Smith River wagon route to the inland settlements and mines, is a recreational community situated at the junction of the Middle and North Forks of Smith River. Here, where the climate is very sunny and mild, and the fishing excellent, a favorite resort area has flourished for years. While still primarily a recreational area, Gasquet has increasingly become the residential choice of many people who prefer to live in its warmer climate, and commute to work in the less sunny coastal belt near Crescent City. This is best indicated by the fact that the permanent residents in 1960 numbered 240, twice the number living there in 1950.

Gold mining, the main enticement for early settlers, remained the backbone of activity in the Smith River Hydrographic Unit for about 15 or 20 years. Until about 1868, the miners made a number of profitable strikes along the tributaries of the Smith River, in addition to scouring the more productive areas in the Klamath River Basin to the east. By 1868, however, easy gold had become scarce, and although an occasional placer mine is still worked, gold mining today has been relegated to a position of lesser importance to the economy of the area.

During most of the past 20 years, chromite, a prime source of chromium, has brought more income to the unit than any other single mineral product. Chromite production, however, has dropped sharply since 1957, due to the federal government's discontinuance of stockpiling this mineral.

The mineral industry, due largely to the production of sand and gravel and chromite, is presently the third most important industry in the hydrographic unit. The production of sand and gravel, accounted for about 75 percent of the total income from minerals within the unit during 1958. This activity, which is closely related to general expansion, reflects the rapid economic growth of the area during the last few years.

Other minerals occurring within the hydrographic unit, and which in the past have been mined in significant quantities include copper, produced at the Alta Copper Mine near the head of Copper Creek, and mercury. Deposits of platinum, clay, and silver have been also developed, although to a lesser extent. In addition, deposits of manganese, graphite, coal, iron, mortzite, and nickel exist within the hydrographic unit. However, these are not present in large commercial quantities and therefore have limited importance in the mineral industry.

Just as the fur trader gave way to the miner in the early history of the Smith River Hydrographic Unit, so also did the miner give way to the lumberjack. The exportation of lumber began in 1859 when a sawmill with a daily capacity of 40,000 board feet was built at Crescent City. About 325,000 acres, or sixty-five percent of the hydrographic unit, are commercial timberlands, estimated by the U. S. Forest Service to contain about 12.2 billion board feet of saw-timber. This commercial timber is composed of three main types: redwood, Douglas fir, and some stands of intermixed true fir, pine, and Douglas fir. Small amounts of other conifers, including sitka spruce, western hemlock, and several varieties of cedar, also grow in the unit. There are also hardwoods such as Oregon myrtle, red alder, giant chinquapin, madrone, big leaf maple, and several varieties of oak.

The forests of Smith River Hydrographic Unit, in addition to being its greatest natural resource, have long been the mainstay of its economy. The lumber industry remained small after its inception in 1853 until additional sawmills were constructed in 1869 and 1872. In 1889, 11.5 million board feet of lumber were exported from the hydrographic unit. This shipping of lumber assured Crescent City's continued importance to the surrounding area. In 1900, the Hobbs-Wall Company established two mills which produced as much as 140 million board feet a year. This production represented the bulk of the lumber output of the hydrographic unit until 1939, when this company went out of business. When the Hobbs-Wall Company failed, the annual lumber production in the unit dropped to 22 million board feet, its lowest level since 1900. However, with the outbreak of World War II, production began to grow steadily, so that by 1948 the output again reached 100 million board feet per year.

The present-day pattern of the lumber industry in the Smith River Hydrographic Unit began to develop about 1950, when the production of veneer, plywood, and remanufactured lumber commenced. The number of plants making these special products increased from three in 1950, with an output of 30 million board feet, to 12 in 1959, with a production of 180 million board feet. The total lumber output amounted to about 120 million board feet in 1950 and to about 435 million board feet in 1959. About 85 percent of the present output of lumber within the hydrographic unit is produced in the vicinity of Crescent City, as compared to only 60 percent of the production in 1950.

With the improvement of U. S. Highway 101, a considerable amount of plywood and veneer, items which are subject to damage from ocean spray, are

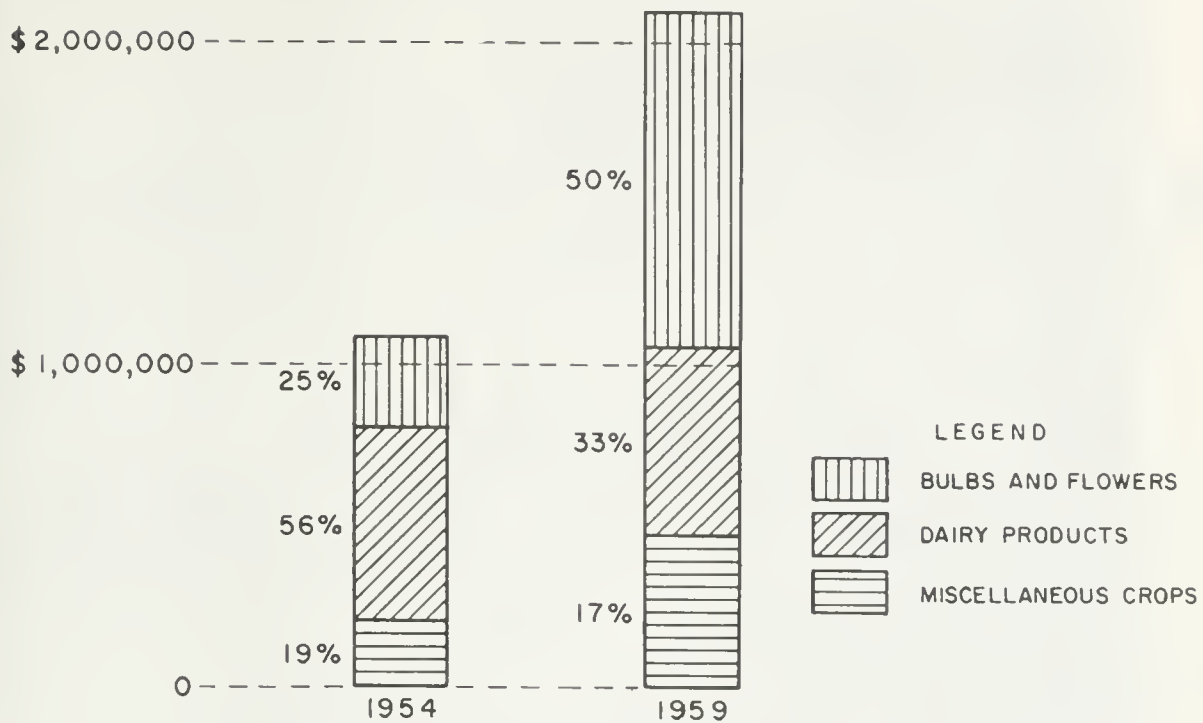
now trucked from the unit. However, about 90 percent of the lumber output continues to be shipped by water from the Crescent City Harbor, with the bulk of it going to Hawaii and Southern California.

Agriculture has continued since the early years to be the second largest industry in the Smith River Hydrographic Unit. Agricultural activities to supply food locally were considerable as early as 1857. At that time, the production of grain and fruit was prominent, but by 1880, dairying had become the chief activity. Some 493,000 pounds of butter were exported from Crescent City in 1889.

The predominant use of land for dairy pasture established an agricultural pattern in the hydrographic unit which has remained relatively unchanged for three-quarters of a century. For many years irrigation was not considered necessary in this area because of the extremely wet climate. Following the introduction of irrigation during the 1940's, a significant new development in the agricultural pattern occurred. In 1954, this new activity, the commercial raising of lily bulbs and flowers, occupied only about 150 acres of irrigated land, and contributed about 25 percent of the total farm income. However, between 1954 and 1959 the income from these products increased fourfold, and in spite of increases in dairying and other farm sales, became the main item of farm income in the Smith River Hydrographic Unit. Figure 1 illustrates this rapid growth and the increase in total farm income during those years.

Today lily bulbs and flowers are sent from the hydrographic unit to all parts of the country and overseas. Although bulbs and flowers are oftentimes shipped from Crescent City by air, the majority of the agricultural products are transported to their local and Northern California markets by truck. The distance to market has always been a limiting factor in developing

Fig. 1. FARM INCOME
SMITH RIVER HYDROGRAPHIC UNIT



an export market for agricultural products from the area. Since the hydrographic unit does not have rail service, and with the nearest rail terminals located in Arcata, 75 miles to the south, and in Grants Pass, Oregon, 87 miles northeast of Crescent City, consumer goods enter the area almost entirely by truck and ship.

Until the last decade, recreation was still one of the smaller activities contributing to the economy of the Smith River Hydrographic Unit. Increasing numbers of visitors from distant areas are now enjoying the unit's great natural beauty and excellent fishing. Two factors largely responsible for this increase are the crowding of many other recreational areas and the improved accessibility to this area. Recreation may soon be, if it is not already, the unit's second largest industry.

Over 150,000 persons a year visit Jedediah Smith Redwoods State Park, a protected stand of virgin forest named for the pathfinder. Many

Del Norte
County
Coastline



Beach near
Crescent
City

also visit the two smaller state parks within the unit. In addition, about 100,000 tourists annually are drawn to the unit by its national and privately owned forests. While most of these visitors are from California, there are also many tourists from other states and foreign countries. The inflow of such tourists is a great benefit to the economy of the unit.

Fishing continues to attract visitors to the hydrographic unit. Many come from hundreds of miles to fish for the salmon and steelhead trout found in local streams. Others head for the coast where clam digging has its enthusiasts, and surf and ocean fishing are popular.

Commercial ocean fishing has become an industry which provides the hydrographic unit with an annual income varying from about half a million to over a million dollars. From year to year, the annual catch varies in quantity and kind. Salmon has been the most consistent principal variety in recent years, but other important varieties are crab and sole. Ocean shrimp, albacore and lingcod are taken in smaller, but significant quantities.

Natural Features

The general topography of the Smith River Hydrographic Unit can be divided into two general types: (1) the Smith River Plain, an emerged marine terrace with low relief extending generally along the coastline of the Pacific Ocean; and (2) the rugged inland Klamath Mountains. The Smith River Plain covers about 60 square miles, extends generally north and south from the town of Smith River to Crescent City, and inland 3 to 5 miles from the ocean to the base of the relatively low mountains.

Mountains comprise about 90 percent of the total land area of the Smith River Hydrographic Unit. Although elevations exceeding 5,000 feet occur only on the eastern edge of the unit (the highest point in the unit is the

peak of Bear Mountain at an elevation of 6,400 feet), the terrain is very rough and difficult to traverse except on the secondary road system of the populated Smith River Plain and the two main state highways leading through the mountains. U. S. Highway 101 provides north and south connections along the coast, and U. S. Highway 199 generally follows the Smith River north-easterly from the coastal plain to intersect U. S. Highway 99 at Grants Pass, Oregon.

The Smith River Hydrographic Unit is located within two physiographic provinces of California. The Smith River Plain along the coast is entirely within the Northern Coast Ranges physiographic province, while the inland mountains surrounding it on the north and east are in both the Northern Coast Ranges and the Klamath Mountains provinces. The geologic formations of the Smith River Plain range in age from Jurassic to Recent. Rocks of Jurassic age, consisting mainly of arkose, chert, and schist, constitute the bedrock underlying the plain and also form the inland mountains. Overlying the Jurassic bedrock throughout most of the Smith River Plain is the Battery formation, consisting of fine sand and silty clay. Its average thickness is about 35 feet. In the vicinity of Crescent City, the St. George formation lies between the Jurassic bedrock and the Battery formation. The St. George formation is of marine origin and is composed of sandstone and shale. In localized areas, the Jurassic rocks are overlain directly by unconsolidated Pleistocene river terrace deposits or Recent flood plain deposits. The terrace deposits occur in several areas: (1) along the Smith River upstream from U. S. Highway 101; (2) in the vicinity of Fort Dick, where the largest terrace covers 5 to 6 square miles; and (3) a narrow strip north of the Smith River. Recent flood plain deposits form the present Smith River flood plain, and vary in width from a few feet near the junction of the South Fork with the

main Smith River, to about a mile at Fort Dick, and to about 4 miles near the tidal mouth of the river. Recent alluvial fan deposits are located on a narrow, almost continuous strip along the foot of the mountains.

The rocks of the inland mountain ranges are principally Jurassic and Cretaceous shale, sandstone, conglomerate, greenstone, and ultrabasic rocks, the last in part altered to serpentine. In the western part of the mountains, younger Tertiary shale, siltstone, and gravel deposits occur at high elevations. Farther east, granitic rocks are present. The Tertiary materials are relatively undeformed, but the older rocks are highly folded and faulted.

Soils suitable for agricultural developments within the Smith River Hydrographic Unit are restricted, for the most part, to the Smith River Plain. The soils of the plain were formed largely from alluvial deposits but vary markedly because of differences in their ages.

The major soil body found in this area belongs to the older alluvial or terrace grouping. These terrace soils are located generally along U. S. Highway 101 and extend the entire length of the plain. They have a relatively fine texture, an acid reaction and, under the existing condition of high rainfall, a moderately good internal drainage. Many parcels of the land mantled with these terrace soils originally afforded a lush stand of redwood forest, but presently support both irrigated and non-irrigated grain and pasture.

The more recent alluvial soils are found in the lower flood plains immediately adjacent to the Smith River, and are generally rather coarse texture, well drained, and readily suited to irrigation development. However, some risk might be anticipated as the area is subject to flooding and erosion.

North of Crescent City, a high water table and surface flooding affect many isolated pockets of land inland from the coastal sand dunes and

along the margins of Lake Earl. These lands afford small acreage for late summer and fall grazing.

Immediately west of Lake Earl lies an area of extremely coarse-textured, relatively infertile soil. The soil lies upon the characteristically hummocky surface of wind-deposited sand dunes; and, because of the relief and a low-range moisture retention, it is difficult to irrigate.

Climate

The Smith River Hydrographic Unit is one of the wettest sections of California. The average annual precipitation varies from about 60 inches at Point St. George, the westernmost coastal point, to over 125 inches at some of the higher inland points. In general, the precipitation in the hydrographic unit is largely orographic in nature, increases with elevation, and at any given elevation is somewhat greater on the windward (southwest) slopes of the mountains. Approximately 75 percent of the precipitation occurs from November 1 through March 31, and about 90 percent from October 1 through April 30. Although the percentage of summer precipitation is small, coastal areas of the unit usually receive some rainfall in both July and August.

Snowfall, which is closely related to elevation, varies in the Smith River Hydrographic Unit from a negligible amount along the coast, to 28 inches at the 1,700-foot elevation of Elk Valley, to 126 inches at the 2,420-foot elevation of Monumental. The average lowest elevation at which there is snow on the ground on April 1 is approximately 4,000 feet.

Maximum and minimum recorded seasonal precipitation, and estimates of 50-year mean seasonal precipitation at selected stations within or adjacent to the Smith River Hydrographic Unit are shown in Table 2. The extremes shown are the highest and lowest seasonal precipitations observed

during the period of record indicated for each station. The 50-year (1905-06 to 1954-55) mean seasonal values are estimates, except the recorded quantity shown for the Orleans station, of the average depth of rainfall which would have been observed at these stations if they had been in existence during those years. It is considered that the values presented for the 50-year period are representative of long-term mean seasonal precipitation available to the unit.

TABLE 2

PRECIPITATION AT SELECTED STATIONS IN OR
NEAR SMITH RIVER HYDROGRAPHIC UNIT
(In inches)

Station	:Elevation: :(in feet):	Annual precipitation			Period of record
		Recorded		Estimated:	
		Maximum	Minimum	50-year mean	
Brookings, Oregon	80	107.62 (1937-38)	38.48 (1923-24)	77.36	1914-1959
Crescent City 1N	45	113.06 (1889-90)	51.76 (1946-47)	62.57	1885-1909, 1946-1959
Crescent City 7ENE	125	107.77 (1920-21)	34.52 (1923-24)	80.07	1913-1945, 1953-1959
Crescent City 11E	360	132.72 (1955-56)	71.68 (1954-55)	90.54	1947-1959
Elk Valley	1,711	118.44 (1955-56)	54.63 (1938-39)	76.25	1938-1959
Gasquet Ranger Station	384	125.89 (1955-56)	74.46 (1954-55)	85.57	1943-1959
Klamath	25	107.27 (1957-58)	55.87 (1946-47)	77.04	1941-1959
Orleans	403	81.93 (1903-04)	22.78 (1923-24)	47.84	1903-1959

The climate of the Smith River Hydrographic Unit is influenced by marine air masses, cold air drainage from higher elevations, and occasionally by drier air masses associated with easterly winds. The Pacific Ocean, which is only 35 air miles from the most inland point in the unit, has a great moderating effect on the climate. However, this moderating influence is somewhat offset by the northerly latitude of the unit; and frost is more frequent here than in other coastal areas of the State. The danger of frost increases with elevation and with distance from the ocean.

The moderate climate of the unit is illustrated generally by the temperature data presented in Table 3. These data, with the exception of the frost-free period values, were taken from the "Climatic Summary of the United States -- Supplement for 1931 through 1952," Bulletin W, published by the U. S. Weather Bureau. The values for the frost-free period were derived by the Department of Water Resources, and represent the average period between the last day in spring and the first day in the fall when the daily minimum temperature fell to 32 degrees Fahrenheit or below.

Water Resources

The Smith River is the only stream in the hydrographic unit for which a long record of runoff exists. This record is supplied by a stream gaging station located a half-mile below the mouth of South Fork Smith River. The station, "Smith River near Crescent City," records a drainage area of 613 square miles, some 90 of which lie within that portion of the North Fork Smith River watershed which lies in Oregon. Relatively uniform from year to year, the runoff at this station totals about seven acre-feet per acre per year, probably the greatest runoff from an area of this size anywhere in California. Variations in flow within the year are also comparatively small. Table 4 summarizes the records for this station.

TABLE 3

SUMMARY OF TEMPERATURE DATA AT SELECTED STATIONS
IN OR NEAR SMITH RIVER HYDROGRAPHIC UNIT
(1931-1952)
(In degrees Fahrenheit)

Station	: :Elevation: :(in feet):	: :Average :Jan. :July :Annual:	: :Extreme :High : Low :	: Average : : daily : : variation:	: Frost-free : period :(in days)
Crescent City 1N	45	44.2 57.9 51.7	92 24	15.8	254
Crescent City 7NE	125	46.1 62.2 54.4	100 19	20.7	---
Elk Valley	1,711	36.3 65.4 50.2	105 0	26.9	125
Happy Camp Ranger Station	1,090	39.0 73.1 55.9	115 6	31.1	175
Orick - Prairie Creek Park	161	42.8 59.6 51.9	95 19	18.1	---
Orleans	403	41.5 72.3 56.8	113 14	29.0	222

TABLE 4

SUMMARY OF RUNOFF DATA
SMITH RIVER NEAR CRESCENT CITY
(1931-37 and 1938-58)

Item of record	: : Acre-feet :	: Percent : of : average :	: Cubic : feet per : second
Average runoff for period of record	2,720,000		---
Runoff in minimum year of record, 1933-34	1,550,000	57	---
Runoff in maximum year of record, 1955-56	4,164,000	153	---
Runoff in maximum month, January 1953	1,349,000	---	---
Maximum instantaneous flow of record, December 22, 1955	---	---	165,000
Minimum instantaneous flow of record, October 21, 1931	---	---	168

During the 1957-58 water year, the year of this study, recorded runoff at this station totaled 3,769,000 acre-feet. Despite the fact that this amount was the third highest on record, and represented 140 percent of the average, the runoff between May 1 and September 30, 1958, was only about 60 percent of the average for this period of maximum use.

CHAPTER II. WATER USE

Some 50 to 60 percent of the water presently used in the Smith River Hydrographic Unit is diverted from surface runoff, and the remaining portion pumped from ground water. For this investigation a survey was made of the diversion and use of water from surface sources. Survey data reported herein include locations and descriptions of diversions, uses and amounts of water diverted, and information on apparent water rights relative to diversions. The criterion for inclusion of individual diversions in this report is whether they apparently divert 10 acre-feet or more per year, regardless of the purposes served. Many of the small diversions omitted on this basis were those serving only one or a few domestic users.

Quantities of water diverted during 1958 were measured in order to further describe the water use conditions. The total surface water diverted is an extremely small fraction of the total runoff of the hydrographic unit.

The measured quantities do not necessarily represent average diversions, since during any single year the quantity diverted will be influenced by precipitation during the growing season and the available streamflow. As stated in Chapter I, runoff in the Smith River, the source of the bulk of the surface runoff in the unit, during the summer of 1958 was only about 60 percent of the average. Considerations other than available water supply, such as economic factors, may also affect the relation of any diversion record to typical operating conditions. No attempt was made herein to assess these factors. The diversion quantities reported herein generally represent the actual amounts of water taken from the respective sources, and therefore include recoverable and irrecoverable losses incidental to the primary use.

Urban water service in the unit is provided at Crescent City, Smith River, and Gasquet -- all from surface water sources. Crescent City and the adjacent urban area are served by the system belonging to the city; whereas Smith River and Gasquet, being unincorporated, are served by small private and mutual water companies. The diversions which supply these three as well as a few smaller communities, are included in tabulations in this report. Of the rural domestic uses, most are supplied by individual wells, but some are supplied by diversion of surface waters.

The location of water wells and the measurement of their production were not covered in this investigation. The areas of all irrigated lands were determined and are reported in Chapter III.

Water Rights

The nature and extent of all rights pertaining to the water supply of an area are an important consideration in the determination of the total water requirements of the area. This report, therefore, includes information about water rights in general and about rights of record within the Smith River Hydrographic Unit.

Most of the water use in the Smith River Hydrographic Unit is based on riparian rights or on appropriative rights established under the provisions of the Water Commission Act of 1914. As of June 28, 1960, there were on file with the State Water Rights Board a total of 120 applications to appropriate water from the streams of the unit. Permits or licenses had been granted on 113 of these applications, four were pending with the board, and three were incomplete as of that date.

Two of the incomplete applications, for storage of 1,235,000 acre-feet per annum at the proposed Canthook Reservoir on the South Fork Smith River, are held by the California Water Commission under the provisions

of Section 10500 of the Water Code. The other 118 applications are for local use, including the direct diversion of a total of about 50 cubic feet per second and diversion to storage of a total of 202 acre-feet per annum.

The California Law of Water Rights, as related to both surface and underground water, is described briefly in Appendix C. A tabulation of data relative to the applications on file with the State Water Rights Board is presented in Table C-1 of Appendix C. Data pertaining to the apparent water rights exercised by the diversions described in this report are presented in Table 5.

Surface Water Diversions

An attempt was made during the survey to locate and obtain data with respect to all diversions of more than 10 acre-feet per year. All diversions actually in use in 1958, and those which had been used within the preceding five years, were included. The date of last use, if known, was recorded for discontinued diversions. Systems for direct diversion, as well as those providing for significant surface storage, were located. All reservoirs which had surface areas of about 3 acres or more were mapped. This size was considered the minimum size that could be delineated on the aerial photographs used. Reservoirs located along, and operated in conjunction with, ditches and pipelines are shown on the land and water use maps, but are not considered as separate systems, and are not assigned location numbers. Similarly, points at which canal systems intercept minor intermittent streams and receive small amounts of water in addition to the primary supply, are not considered as separate diversions.

In some situations, water users have made efficient use of water supply by rediverting field runoff or spill collected from their own upstream

Crescent City
Diversion
from
Smith River
(17N/1W-13B1)



Trout Hatchery
Diversion
from
Monkey Creek
(17N/3E-31)

diversion systems. In this investigation, such points of redirection are neither located on the maps nor assigned numbers. If return flow from another water user's operation is redirected, or if there is doubt as to the origin of the water, the diversion is delineated and assigned a number. Diversion systems of water companies or groups of water users are considered as single units; individual customer distribution points are not shown on the maps.

There were 62 diversions of surface water located in the unit in 1958. Points of diversion and main ditches or pipelines used to convey water from them are delineated on the 10 sheets of Plate 2, entitled "Land and Water Use." The diversions are listed in Table 5.

Numbering System for Surface Water Diversions

Surface water diversions are numbered to indicate their approximate location according to township, range, and section within the federal land survey system. In this report, each section is subdivided into 40-acre plots, and the diversions are numbered within each of these 40-acre plots according to the order in which they were located. This system is illustrated on Plate 2. For example, diversion 17N/2E-20R1, which is shown on Sheet 3 of Plate 2 labeled as "20R1," is the first diversion located in the southeast quarter of the southeast quarter of Section 20 in Township 17 North, Range 2 East, Humboldt Base and Meridian (HB&M).

Descriptions of Surface Water Diversions

Description, history, and other information relating to surface water diversions were obtained by field inspection, by interview with water users or their representatives, and by reference to prior reports and official records. This information is summarized in Table 5. Data in the table are

arranged by diversion location number within each subunit. Each location number is followed by the name of the owner, the source of water, the purposes of each diversion, the quantity of water diverted during 1958, the extent of use, such as the number of acres irrigated, and the method of application of water. If the purpose listed is not the usual use for that diversion, notation is made in the "remarks" column. The extent of domestic use is specified only when five or more connections are served. Stockwatering of less than 10 head of livestock is considered to be a domestic use. The extent of irrigation use is based on the land use survey described in Chapter III.

The types of water rights under which the respective diversions are considered to be made are indicated in Table 5 under "apparent water right." Diversions apparently made under rights based on the appropriative doctrine (see Page C-5, Appendix C) are listed as "appropriative." Those diversions for which the conditions for riparian use as described in Appendix C apparently prevail, but for which no appropriation was known to exist, are listed as "riparian." Diversions listed as appropriative may also be riparian, although no attempt was made in such cases to determine the riparian status.

The actual amount of the right if established and known, and a reference to the source of the data, are also included under "apparent water right." In the case of an appropriative right, the amount tabulated is that found in the filing, if any, or in the application, or in the latest permit or license which may have been issued in connection with the application. The reference given for an appropriation initiated after the effective date of the Water Commission Act of 1914 is the number of the application on file with the State Water Rights Board. For appropriations prior to 1914, the reference, if known, is the book and page number of the official records of Del Norte County. Such filings were made in accordance with Sections 1410 and 1422 of the Civil Code, as enacted in 1872, which preserved the priority

TABLE 5

DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Location number and/or plate 2 sheet number	Diversion name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acre-feet	Amount		Reference			
						Type	Amount				
ILLINOIS RIVER SUBUNIT											
H B & V											
18N/4E-201 (Sheet 2)	Carl A. Wieting	Elk Creek	Fish culture Decr.	10,000 trout Fishing	Not meas.	Approp.	2.0 cfs	A-18608a	1955	Gravity: wood dam 8 feet high, 40 feet long, with short wood flume and 400 feet of earth ditch to trout pond.	Former owner: Leslie Aller.
19N/5E-3401 (Sheet 2)	Aller Placer Mines	Dunn Creek	Mining Domestic Fire or connections	Sluicing Less than 5 families or connections	Not meas.	Approp.	3.0 cfs	A-6126a	1928	Gravity: wood dam 6 feet high, 45 feet long, with 250 feet of wood flume to mining area and 0.3 mile earth ditch serves incidental uses.	
MIDDLE FORK SUBUNIT											
17N/2E-1901 (Sheet 3)	Samuel Mutual Water Company	Tributary to Smith River	Munic.	37 connections	Not meas.	Approp.	0.075 cfs	A-6503a	1928	Gravity: 0.3 mile of 4- and 6-inch pipe to service area.	Former owners: C. R. and J. L. Ward.
17N/2E-2011 (Sheet 3)	Charles R. Coughlan Mine O. Keller	Springs tributary to Smith River	Munic.	37 connections	Not meas.	Approp.	(*) 0.03 cfs	Book C, page 325 ^a A-7513a	About 1852	Gravity: 600 feet of earth ditch and 200 feet of 6-inch pipe to service area.	For additional water right information, see appendix D.
17N/2E-2012 (Sheet 3)	Upper Field Ranch Charles R. Coughlan B. C. Endert Mina G. Keller	Springs tributary to Smith River	Domestic	6 connections	Not meas.	Approp.	(*) 0.025 cfs	Book C, page 323 ^a A-7512a	About 1852	Gravity: 0.2 mile of earth ditch, 6-inch pipe, and wood flume to area of use.	For additional water right information, see appendix D.
17N/3E-381 (Sheet 4)	Trout Haven Hollis J. and Jean Nunneley*	Monkey Creek	Fish culture	409,000 trout per year for stock and food	Not meas.	Approp.	2.25 cfs	A-11525a	1946	Gravity: concrete dam 10 feet high, 60 feet long, with 125 feet of earth ditch, 110 feet of rock tunnel, and 2,400 feet of wood flume to area of use.	Former owners: Glen R. Abby, McCamon, John L. Merriam. Land leased from United States Six Rivers National Forest.
17N/3E-491 (Sheet 4)	E. M. Fletcher Charles Tuttle	Patrick Creek	Power	15 kw	Not meas.	Approp.	5.0 cfs	A-6453 ^a	1929	Gravity: concrete and log dam 5 feet high, 50 feet long, with 325 feet of 24- and 36-inch pipe, 0.3 mile of earth ditch and 500 feet of 18-inch pipe to powerplant.	Former owners: Lottie Raymond and Sons, Samuel J. Wilson, Patrick Creek Corp. Water right in name of Patrick Creek Corp.
17N/3E-491 (Sheet 4)	Howard E. and Minnie Raymond	Springs tributary to Patrick Creek	Power Domestic	2.5 kw Less than 5 families or connections	Not meas.	Approp.	0.28 cfs	A-15334 ^a	1948	Gravity: concrete dam 4 feet high, 9 feet long, with 0.1 mile of 4-inch pipe to area of use.	Water right assigned to Ed Carlson February 1960.
17N/4E-5F1 (Sheet 4)	Elmer F. and Pearl A. Johnston	Tributary to Middle Fork Smith River	Power Domestic	18.7 kva capacity 12 connections	Not meas.	Approp.	2.5 cfs	A-12045 ^a	Prior 1929	Gravity: concrete dam 14 feet high, 30 feet long, with 1,400 feet of wood flume and 0.1 mile of 12-inch pipe to area of use.	

* See remarks
— Information not available
For lettered footnotes, see last page of table.

TABLE 5 (Continued)
DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Location number and/or plot 2 sheet number	Diversion name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted acre-feet	Type	Amount	Reference			
MILL CREEK SUBUNIT											
15N/1E-6B1 (Sheet 7)	C. P. and Marie Ruffman*	Mill Creek	Irrig.*	(*)	None	Approp.	0.06 cfs	A-15193 ^a	1953	Pump: portable, 75-hp gasoline engine with direct connection to sprinkler system.*	Ownership changed to Rellim Redwood Co. in 1959. Previously irrigated 9 acres. Diversion equipment used at 15N/1E-6B1, -7B1, and 16N/1E-31R1 in Mill Creek Subunit, and 16N/1W-3J1 in Smith River Plain Subunit.
15N/1E-6F1 (Sheet 7)	C. P. and Marie Ruffman*	Mill Creek	Irrig.*	(*)	None	Approp.	0.04 cfs	A-15192 ^a	1953	Pump: same as 15N/1E-6B1.	Previously irrigated 3 acres. Other remarks under 15N/1E-6B1 pertain.
15N/1E-7B1 (Sheet 7)	C. P. and Marie Ruffman*	Mill Creek	Irrig.*	(*)	None	Approp.	0.10 cfs	A-15191 ^a	1953	Pump: same as 15N/1E-6B1.	Previously irrigated 14 acres. Other remarks under 15N/1E-6B1 pertain.
15N/1E-7D1 (Sheet 7)	C. P. and Marie Ruffman*	Mill Creek	Irrig.*	(*)	None	Approp.	0.09 cfs	A-15190 ^a	1953	Pump: same as 15N/1E-6B1.	Previously irrigated 16 acres. Other remarks under 15N/1E-6B1 pertain.
16N/1E-31R1 (Sheet 5)	C. P. and Marie Ruffman*	Mill Creek	Irrig.*	(*)	None	Approp.	0.33 cfs	A-16445 ^a	1955	Pump: same as 15N/1E-6B1.	Previously irrigated 36 acres. Other remarks under 15N/1E-6B1 pertain.
NORTH FORK SUBUNIT											
18N/2E-5J1 (Sheet 1)	Robert R. Moore	Springs tributary to North Fork Smith River	Power Domestic	2.5 kv Less than 5 families or connections	Not meas.	Approp.	0.45 cfs 0.15 cfs	A-14745 ^a A-14606	Prior 1951	Gravity: small earth dam with 750 feet of 8-, 6-, and 4-inch pipe to powerplant, and parallel 4-inch pipe for domestic supply.	
ROWDY CREEK SUBUNIT											
18N/1W-23G1 (Sheet 1)	William K. Owen (Smith River town supply)	Dominie Creek	Munic.	150 connections*	Not meas.	Approp.	1,000 MI	Book A, Page 63 ^b	1892	Gravity: earth and log dam 7 feet high, 40 feet long, with 40- by 85-foot settling basin and 0.7 mile of 8-inch pipe to service area.	Former owners: Anthony Water System, T. B. Outler, James R. Owen, Smith River Power Company, Public Utilities of California. Supplies town of Smith River except during winter months when 18N/1W-23G2 is used.
18N/1W-23G2 (Sheet 1)	William K. Owen (Smith River town supply)	Spring tributary to Dominie Creek	Munic.	(*)	Not meas.	(c)	--	--	1952	Gravity: earth and log dam one foot high, 12 feet long, with short pipeline to settling basin of 18N/1W-23G1.	Former owners: Anthony Water System, T. B. Outler, James R. Owen, Smith River Power Company, Public Utilities of California. Supplies town of Smith River in lieu of 18N/1W-23G1 during winter months when water in Dominie Creek is muddy.

* See remarks.
-- Information not available.
For lettered footnotes, see last page of table.

TABLE 5 (Continued)

DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Location number and/or plate 2 sheet number	Diversion name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acre-feet	Type	Amount	Reference			
SMITH RIVER PLAIN SUBUNIT											
16N/1E-16A1 (Sheet 5)	Douglas Park Water System	Tributary to Smith River	Domestic	1L connections	Not meas.	Approp.	0.025 cfs	A-6184 ^a	1929	Gravity; 0.1 mile of 4- and 8-inch pipe to area of use.	Former owner: Dr. G. N. Douglas. Serves water users in community of Douglas Park by mutual agreement. Officers of organization: President, Robert Hone; Secretary, Bertha Garrison.
16N/1W-311 (Sheet 5)	C. F. and Marie Huffman	Jordan Creek	Irrig. [*]	(*)	None	Approp.	0.33 cfs	A-16446 ^a *	1954	Pump; same diversion equipment as 15N/1E-681, Mill Creek Subunit.	Former owner: C. F. Huffman, Sr. Previously irrigated 43 acres. Diversion equipment also used for Huffman's diversions in Mill Creek Subunit. Water right cancelled August 1959.
16N/1W-312 (Sheet 5)	C. L. English Ariet Short	Jordan Creek	Irrig.	2L acres by sprinkler	7	Approp.	0.37 cfs	A-17811 ^a	1957	Pump; 10-hp electric motor with 0.1 mile of 4-inch pipe to distribution system.	
16N/1W-921 (Sheet 5)	Charles E. Dillman	Old Mill Creek	Irrig. Stock.	1L acres by sprinkler 17 head	12	Riparian	--	--	About 1880	Pump; two, 2-hp electric motors with direct connection to distribution system.	Former owners: Hobbs, Hall and Company, Dayton.
16N/1W-921 (Sheet 5)	Cal-Ore Veneer, Inc.	Tributary to Lake Earl	Indust.	Lumber mill	62	(c)	--	--	1951	Pump; 3-hp electric motor with short 4-inch pipeline to log pond.	Former owner: Del Norte Veneer.
16N/1W-9H1 (Sheet 5)	Standard Veneer and Timber Company	Tributary to Lake Earl	Indust.	Lumber mill	Not meas.	(c)	--	--	1951	Pump; 25-hp electric motor with short 8-inch pipeline to log pond.	
16N/1W-9P1 (Sheet 5)	Cal-Ore Veneer, Inc.	Springs tributary to Lake Earl	Indust. [*]	(*)	None	Approp.	0.01 cfs 35 af Storage	A-14083 ^a	1950	Gravity; earth dam 6 feet high, 35 feet long, with spring-fed 50-acre-foot log pond.	Former owners: Lucas Lumber Company, Diebold Mills, Inc. Previously supplied a lumber mill.
16N/1W-10A1 (Sheet 5)	Ken D. Cunningham	Jordan Creek	Irrig.	27 acres by sprinkler	3	(c)	--	--	1955	Pump; 2-hp electric motor with 0.2 mile of 2- and 3-inch pipe to distribution system.	
16N/1W-14P1 (Sheet 5)	Medford Veneer and Plywood Corp.	Jordan Creek	Indust.	8L-acre-foot log pond	36	Approp.	0.25 cfs 8L af storage	A-14607 ^a	1951	Pump; 3-hp electric motor with 0.7 mile of 4-inch pipe to log pond.	Former owner: Pacific Veneers, Inc.
16N/1W-18C1 (Sheet 5)	Northern California Plywood, Inc.	Dead Lake	Power Indust.	1,563 kva capacity Lumber mill	2,647 ^a	Approp.	11.1L cfs	A-15264 ^a	1953	Pumps; one 60-, two 10- and one 1.5-hp electric motors with steel pipelines for uses indicated; and four additional pumps maintained for fire protection.	Former owner: Paragon Plywood Corporation. Amount diverted does not include output for weekly fire pump tests.
16N/1W-19A1 (Sheet 5)	City of Crescent City	Myer Creek	Munic.	(*)	80 ^a	Approp.	0.785 cfs	A-14522 ^a *	About 1912	Pump; 20-hp electric motor with 6-inch pipeline to service area.	Former owners: Mountain Power Company, Otto Nevers, Crescent City Water Co. Amount diverted supplemented 16N/1W-20A1. This diversion was discontinued upon completion of 17N/1W-13B1 in February 1959. Water right revoked in December 1959.

* See remarks

-- Information not available.

For lettered footnotes, see last page of table

TABLE 5 (Continued)
DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Location number and/or sheet number	Overseer name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of approval or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acre-feet	Type	Amount	Reference			
SMITH RIVER PLAIN SUBUNIT (Continued)											
168/14-20K1 (Sheet 5)	City of Crescent City	Elk Creek	Munic.	1,680 connections*	225	Approp.	0.5 cfs	A-2459a	About 1921	Gravity; small wood diversion structure with 250 feet of pipe and earth ditch to treatment plant and booster pumps with 6-inch pipeline to service area.	Former owners: Mountain Power Company, Otto Nevers, Public Utilities of California Corp., Crescent City Water Company. Received supplemental supply from 168/14-19J1 and -21C1. This diversion was discontinued upon completion of 178/14-13B1 in February 1959.
168/14-20J1 (Sheet 5)	Forty-first District Agricultural Association	Tributary to Elk Creek	(*)	(*)	Not meas.	Riparian	--	--	1951	Pump; electric motor* with 2,700 feet of 2-, 3-, and 4-inch pipe to distribution system.	Used for watering fairgrounds, sprinkling roads, and miscellaneous construction purposes. 5-hp motor used until July 1958 and 7.8 hp thereafter.
168/14-21C1 (Sheet 5)	City of Crescent City	Tributary to Elk Creek	Munic.	(*)	311*	Approp.	0.557 cfs	A-13996a	1950	Pump; 7.5-hp electric motor with short pipe to filter system, 15-hp booster pump, and 6-inch pipeline to service area.	Former owners: Yoder and Helmar, Del Norte Milling Company, Crescent City Water Company. Amount diverted supplemented 168/14-20K1. This diversion was discontinued upon completion of 178/14-13B1 in February 1959.
168/14-21E1 (Sheet 5)	West Coast Veneer Company and Lund Plywood and Manufacturing Co.	Tributary to Elk Creek	Indust.	Lumber mill	17	Riparian	--	--	1947	Pump; 3-hp electric motor with short 3-inch pipeline to log pond.	Former owner: Sunset Lumber Company.
168/14-21E2 (Sheet 5)	West Coast Veneer Company and Lund Plywood and Manufacturing Co.	Tributary to Elk Creek	Indust.*	(*)	None	Approp.	0.06 cfs storage	A-15473a	1947	Pump; electric motor with short 3-inch pipeline to log pond.	Former owners: Sunset Lumber Company, Dead Lake Lumber Company, Pioneer Lumber Company. Previously supplied 6-acre-foot log pond.
168/14-28B1 (Sheet 5)	A. C. Patton Lumber Corporation	Elk Creek	Indust.	Lumber mill	210	Approp.	0.48 cfs storage	A-15000a	1951	Pump; 100-hp electric motor with 0.7 mile of 8-inch pipe to log pond.	Former owner: Castle Sawmills, Inc.
168/14-28C (Sheet 5)	Mellmar and Prese Lumber Company	Elk Creek	Indust.	Lumber mill	50	(c)	--	--	1951	Pump; 5-hp electric motor with short 4-inch pipeline to log pond.	
178/14-30J1 (Sheet 3)	Hussey Ranch Corp.	Tributary to Smith River	Irrig.*	(*)	None	(c)	--	--	1958	Storage dam and pump; earth dam 12 feet high, 1,700 feet long, with 15-acre-foot reservoir, and pump directly connected to distribution system.	Diversion dam and sprinkler system completed in December 1958. Used to water greens of Del Norte Country Club golf course beginning in 1959.
178/14-21J1 (Sheet 3)	Clarence A. Westrook	Smith River	Irrig.	14 acres by sprinkler	84	Riparian	--	--	About 1938	Pump; 20-hp electric motor with direct connection to distribution system.	Previously irrigated an additional 11 acres.
178/14-21J1 (Sheet 3)	Lester A. Barth, S. and L. A. Ulrich	Smith River	Irrig.	10 acres by sprinkler	59	Approp.	0.28 cfs	A-13997b	1945	Pump; 15-hp electric motor with direct connection to distribution system.	

* See Remarks.
-- Information not available.
For lettered footnotes, see last page of table.

TABLE 5 (Continued)

DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Location number and/or plate 2 sheet number	Diversion name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acre-feet	Type	Amount	Reference			
SMITH RIVER PLAIN SUBUNIT (Continued)											
H B & N											
17N/14-1311 (Sheet 3)	Charles E. and Helen E. Wetherall	Smith River	Irrig. Stock.	140 acres by sprinkler, 125 head	61	Alperton	--	--	1946	Pump; 25-hp electric motor with direct connection to distribution system.	Former owners Harry, Warren, Walter and Clarence Bailey.
17N/14-1021 (Sheet 3)	Presley D. Tryon	Tryon Creek	Irrig.	52 acres by sprinkler*	13	Alperton	--	--	About 1945	Pump; 25-hp electric motor with direct connection to distribution system.	Former owner Harold Hoxley. Previously irrigated an additional 52 acres.
17N/14-1151 (Sheet 3)	Presley D. Tryon	Smith River	Irrig. Stock.	65 acres by sprinkler, 75 head	Not shown.	Alperton	--	--	1946	Pump; 25-hp electric motor with short pipeline to distribution system.	Former owner Henry Gilson.
17N/14-1152 (Sheet 3)	Presley D. Tryon	Smith River	Irrig. Stock.	(*) 75 head	Not shown.	Alperton	--	--	1946	Pump; 25-hp electric motor with short pipeline to distribution system.	Previously irrigated 108 acres.
17N/14-1181 (Sheet 3)	Pelican Bay Construction Services, Inc.	Smith River	Indust.	Washing gravel	100	Alperton	--	--	1956	Pump; 15-hp electric motor with 0.1 mile of 5-inch pipe to area of use.	
17N/14-1182 (Sheet 3)	Murray Tryon	Smith River	Irrig.	162 acres by sprinkler	61	Alperton	--	--	About 1945	Pump; 60-hp electric motor with distribution system which includes 4,500 feet of 8-inch pipe.	
17N/14-1201 (Sheet 3)	Elmer Huffman Maryann Wakefield	Smith River	Irrig.	98 acres by sprinkler	48	Alperton	0.58 cfs	A-14,948a	About 1950	Pump; 40-hp electric motor with direct connection to distribution system.	
17N/14-1301 (Sheet 3)	City of Crescent City	Smith River	Munic.*	(*)	None	Alperton	9.8 cfs	A-17356a	1958	Pump; two 100-hp electric motors with 8.2 miles of 10-, 12-, and 14-inch pipe, 50,000-gallon emulsifier tank, and 100,000-gallon storage tank.	First used February 7, 1959 to serve City of Crescent City replacing 10N/14-1901, -2001, and -2101.
17N/14-1301 (Sheet 3)	Austin S. Hunter	Springs tributary to Lake Earl	Irrig.*	(*)	None	Alperton	--	--	About 1950	Pump; 20-hp electric motor with direct connection to distribution system.	Previously irrigated 44 acres by sprinkler.
17N/14-1401 (Sheet 3)	Charles W. Riley	Bosch Creek	Irrig. Stock.	23 acres by sprinkler, 30 head	11	Alperton	--	--	About 1949	Pump; portable, 25-hp gasoline engine with direct connection to distribution system.	Portable pump location varies in vicinity of location indicated.
18N/14-2181 (Sheet 1)	Robert A. and Elizabeth C. Hastings Robert H. and Bernice C. Stanhurst	Ritter Creek*	Irrig.	73 acres by sprinkler*	12	Alperton	0.55 cfs 0.26 cfs 2 af storage	A-8873a A-11385a	1937	Gravity and pump; concrete dam 4 feet high, 20 feet long, with gasoline-powered pump and 1,000 feet of 8-inch pipe to distribution system.	Former owner Abby E. Fielding. Area irrigated received supplemental supply from ground water. Also known as Mitchell Creek by local residents.

* See remarks.

-- Information not available.
For lettered footnotes, see last page of table.

TABLE 5 (Continued)
DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Location number and/or owner Plots 2 sheet number	Diversion name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acre-feet	Type	Amount	Reference			
SMITH RIVER PLAIN SUBUNIT (Continued)											
H.B. & M. 18N/14-27D1 (Sheet 1)	Clara B. Brogan	Delilah Creek	Irrig.	14 acres by sprinkler	14	Riparian	--	--	1949	Pump; 20- and 7.5-hp gasoline engines* with short 6-inch pipeline to distribution system.	7.5-hp pump not used in 1958.
18N/14-27D1 (Sheet 1)	Clara B. Brogan	Delilah Creek	Irrig. Stock.	85 acres by sprinkler 65 head	66	Approp.	1.06 cfs	A-11041a	1945	Pump; 20-hp electric motor with direct connection to distribution system.	
18N/14-27D2 (Sheet 1)	Reservation Ranch	Delilah Creek	Irrig.	12 acres by sprinkler*	6	Riparian	--	--	1958	Pump; portable, 16-hp gasoline engine with direct connection to sprinkler system.	Area irrigated received supplemental supply from 18N/14-27D2. Portable pump also used at 18N/14-28D1.
18N/14-27D1 (Sheet 1)	Reservation Ranch	Delilah Creek	Irrig. Stock.	88 acres by sprinkler* 600 head*	82	Riparian	--	--	1946	Pump; 20-hp electric motor with 0.6 mile of 8-inch pipe to distribution system.	Received supplemental supply from 18N/14-27D2 and -27D1 to water stock. Previously irrigated an additional 18 acres.
18N/14-27D2 (Sheet 1)	Reservation Ranch	Tributary to Tillam Slough	Irrig.	31 acres by sprinkler and furrow	30*	Riparian	--	--	About 1938	Pump; 10-hp electric motor with direct connection to distribution system.	Portion of amount diverted supplemented 18N/14-27D2 and -27D1.
18N/14-27D1 (Sheet 1)	Reservation Ranch	Tributary to Tillam Slough	Irrig.	106 acres by sprinkler	128*	Riparian	--	--	1947	Pump; 25-hp electric motor with direct connection to distribution system.	Portion of amount diverted supplemented 18N/14-27D1.
18N/14-27D1 (Sheet 1)	Robert G. Sarina, Sr.	Tributary to Smith River	Irrig. Stock.	48 acres by sprinkler* 90 head	33	Riparian	--	--	1945	Pump; 7.5-hp electric motor with direct connection to distribution system.	Previously irrigated an additional 18 acres.
18N/14-28D1 (Sheet 1)	Reservation Ranch	Tributary to Smith River	Irrig.	26 acres by sprinkler*	27	Riparian	--	--	1952	Pump; portable, 16-hp gasoline engine with direct connection to sprinkler system.	Portable pump also used at 18N/14-27D2.
SOUTH FORK SUBUNIT											
15N/2E-13D1 (Sheet 7)	Wilson and May L. Freeman	Jones Creek	Irrig. Stock.	39 acres by sprinkler 10 head	Not meas.	Approp.	1.0 cfs	A-16701a	1954	Pump; 130-hp diesel engine with 0.4 mile of 4- and 6-inch pipe to distribution system.	
15N/1E-28D1 (Sheet 7)	Collins McClendon	Springs tributary to Goose Creek	Mining	Washing chromium ore	20	(c)	--	--	About 1938	Gravity; 0.5 mile of metal flume to 500-gallon tank and short pipeline to ore-concentrating tables.	

* See remarks.
-- Information not available.
For lettered footnotes, see last page of table.

TABLE 5 (Continued)

 DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
 SMITH RIVER HYDROGRAPHIC UNIT

Location number and plot 2 sheet number	Diversion name and/or owner	Source	Water use in 1958			Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acrs.-feet	Type	Amount	Reference			
H R. N.											
18N/1W-501 (Sheet 1)	Ray W. and Mable H. Strubbing	Gilbert Creek	Irrig.	71 acres by sprinkler	27	Approp.	0.11 cfs	A-13775a	1950	Pump; 25-hp electric motor with direct connection to distribution system.	
18N/1W-501 (Sheet 1)	William D. and Mary J. Fisher	Gilbert Creek	Irrig.	69 acres by sprinkler	13	Approp.	0.08 cfs	A-12776a	1948	Pump; 10-hp electric motor with direct connection to distribution system.	Former owners: Chester and Mabel Maria.
19N/1W-3301 (Sheet 1) (Export)*	M. L. DeMartin	Winchuck River	Irrig.	2 acres by sprinkler	Not meas.	(*)	(*)	(*)	1947	Pump; 30-hp electric motor with direct connection to distribution system.	Most of water diverted is exported out-side Smith River Hydrographic Unit to irrigate about 80 acres in the State of Oregon. Water right is filed with the State of Oregon.

* See remarks.

a. Refers to applications to appropriate water filed with State Water Rights Board.

b. Del Norte County Records.

c. Insufficient information to determine type of water right.

of a diligent appropriator from the time of filing, and enabled him to prevail over a concurrent nonstatutory appropriator. The single filing referred to herein indicating water measurement in miner's inches does not specify which of the two miner's inches in use in the area before 1914 (1/40 or 1/50 cfs) was intended.

The determination of water rights under which the various diversions are made is based upon the best information available from the owner, from files of the State Water Rights Board, from official records, and from other sources. Although this information is believed to be accurate, it is emphasized that it is not based on sworn claims or testimony and should in no way be construed to represent a conclusive determination of water rights.

A detailed description of the diversion systems, including dams, pumps, and main conduits, as well as any special features, is included in Table 5. The diversions are also classified as gravity, pump, and storage, according to the following definitions:

Gravity diversion - A system in which water is taken from its natural course at a diversion structure and conveyed by gravity through a canal or pipeline to the area of use. Such a diversion may have a reservoir on the stream but the capacity is small compared with the amount of water diverted and provides no significant carry-over storage from winter to summer.

Pump diversion - A system in which water is pumped from its natural course through a pipeline to the area of use or to a gravity conduit located at a higher elevation.

Storage diversion - A system consisting of or including a surface reservoir having significant carry-over storage within each season or from season to season.

Systems not exclusively of one of these basic types are listed as combinations of those types which best describe them.

The "remarks" column contains such information as the names of former owners, known changes of ownership after 1958, and further details explaining entries in the other columns.

Information about two diversions, too detailed to be included in Table 5, is given in Appendix D. Most of this information relates to history, ownership, and water rights.

Records of Surface Water Diversions

Continuous or periodic measurements of the quantities of surface water diverted by 32 of the 62 diversions in the unit were made by the Department of Water Resources in 1958. The total amount of water diverted at the 32 diversions for which measurements are reported was about 4,550 acre-feet, as summarized by primary uses in Table 6. Detailed results of the measurement program are reported in Table 7. Only quantities which were based on actual measurements or reliable estimates are included. Where feasible, measurements of each diversion were made at a location above the area of first use as close to the diversion intake as possible, but below any regulatory spill. Exceptions are noted in Table 7.

Determinations of diverted quantities were made primarily by testing of pumps. These observations were supplemented by interviews of water users to obtain data on possible abrupt changes in operation between readings.

The quantities in Table 7 are based on various methods listed in the column, "Method of observation and calculations." Where the monthly data were sufficiently reliable, quantities are shown. When the diversion during a month is known to have been zero, it is so indicated. The data, however, were sometimes not sufficiently detailed to justify a breakdown into monthly quantities. These cases are indicated by --NR--. Data which were incomplete or uncertain are designated as estimates. Notations regarding the extent of irrigation period indicate the overall period of

TABLE 6

SUMMARY OF USE AND MEASUREMENTS
OF SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT
IN 1958

Total number of surface water diversions	: Number of : diversions : active : in 1958 :	Purpose	: Number of : measured : diversions :	: Measured quantity of water diverted (in acre-feet)
31	24	irrigation and/or stock- watering	21	790
11	10	municipal and/ or domestic	3	620
9	7	industrial	7	3,120
5	5	hydroelec- tric power	0	--
3	2	recreation, and/or fish culture	0	--
2	2	mining	1	20
1	1	export for irrigation outside the unit	0	--
—	—		—	—
62	52		32	4,550

irrigation, but not necessarily that daily or continuous irrigation was practiced through the period.

Index to Surface Water Diversions

For convenience in locating information regarding specific diversions, an alphabetical index to diversion owners and diversion names is provided in Table 8 at the end of this chapter. For each diversion, this table indicates the subunit, the sheet number of Plate 2, and the page on which pertinent data appear.

Imports and Exports

There are no imports of surface water into the Smith River Hydrographic Unit. However, most of the water from diversion 19N/1W-33DL is exported from the unit. This diversion, owned by Mr. M. L. DeMartin, is located on the Winchuck River some 30 feet south of the California-Oregon state line, and diverts under a water right obtained in the State of Oregon. The water is used to irrigate about 80 acres, some 78 of which are located in the State of Oregon.

Consumptive Use

In the Smith River Hydrographic Unit, virtually all of the consumptive use of applied water is for irrigated agriculture, lumber mills, and urban use. Consumptive use of water is defined as water consumed by vegetative growth in transpiration and building of plant tissue, and by water evaporated from adjacent soil, from water surface, and from foliage. It also includes water similarly consumed and evaporated by urban and non-vegetative types of land use. The consumptive use of water for hydroelectric power generation, fish culture, and mining operations is negligible, consisting primarily of evaporation from canal and pond surfaces.

TABLE 7
MONTHLY RECORDS OF SURFACE WATER DIVERSIONS
SMITH RIVER HYDROGRAPHIC UNIT
1958

Location number	Diversion name or owner	Use	Point of measurement or estimate	Method of observation and calculation	Amount diverted, in acre-feet												Remarks	
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		Total
ILLINOIS RIVER, MIDDLE FORK, MILL CREEK, NORTH FORK, AND ROWDY CREEK SUBUNITS																		
(No diversions indicated in these subunits.)																		
SMITH RIVER PLAIN SUBUNIT																		
16N/14-1	C. L. Enright - Artist Short	Irrigation 6/18/58 - 9/6/58	At pump	Pump test and power records	0	0	0	0	0	2	2	3	0	0	0	0	7	Amount diverted January - March includes 2,500 acre-feet pumped through powerplant for coolant. Amount diverted does not include output from weekly fire pump tests. An undetermined amount was diverted to tests during construction, January - April.
16N/14-2	Charles E. Dillman	Irrigation and at powerplant 1/2/58 - 1/15/58	At pump	Pump test and hours of operation	0	0	0	1	1	0	3	3	2	0	0	0	12	
16N/14-3	Calvin Verner, Inc.	Industrial 5/5/58 - 1/7/58	At pump	Pump test and hours of operation	0	0	0	0	7	9	15	14	13	4	0	0	62	
16N/14-4	Ken U. Cunningham	Irrigation during Set-back	At user	Pump test and power records	0	0	0	0	0	0	2	1	0	0	0	0	3	
16N/14-5	Westford Verner and Company, Inc.	Industrial 1/1/58 - 1/1/58	At pump	Pump test and hours of operation	0	0	0	2	3	0	7	7	0	0	0	0	36	
16N/14-6	Northern Electric Company, Inc.	Industrial 1/1/58 - 1/1/58	At user	Pump ratings and estimated hours of operation	82.6	74.5	82.6	29	30	29	16	30	29	30	29	30	2,647	
16N/14-7	City of Crescent City	Municipal	At pump	Pump ratings and power records	-----NR-----	7	12	15	15	14	15	14	13	3	1	8*	Amount diverted January - March includes 2,500 acre-feet pumped through powerplant for coolant. Amount diverted does not include output from weekly fire pump tests.	
16N/14-8	City of Crescent City	Municipal	At pump	Pump ratings and power records	13	20	20	17	19	20	24	25	18	14	17	16		225
16N/14-9	City of Crescent City	Municipal and Industrial	At pump	Pump ratings and power records	26	44	26	25	27	26	27	27	26	27	25	25		311
16N/14-10	West Coast Veneer Company and Lund Lumber and Manufacturing Co.	Industrial 1/1/58 - 1/1/58	At pump	Pump test and hours of operation	0	0	0	0	0	3	3	3	2	2	0	0		17
16N/14-11	A. J. Dittman - Lumber Co.	Industrial 1/1/58 - 1/1/58	At pump	Pump test and power records	0	0	0	9	29	26	23	24	27	29	17	11		210
16N/14-12	Bellevue and Leeper Lumber Company	Industrial 1/1/58 - 1/1/58	At pump	Pump test and hours of operation	0	0	0	0	6	4	11	11	12	6	0	0		50

* See Remarks
NR No record for period indicated.
----- Overrun estimated for period indicated

TABLE 7 (Continued)
MONTHLY RECORDS OF SURFACE WATER DIVERSIONS
SMITH RIVER HYDROGRAPHIC UNIT

1958

Location number	Diversion name or owner	Use	Point of measurement or estimate	Method of observation and calculation	Amount diverted, in acre-feet												Remarks	
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		Total
SMITH RIVER PLAIN SUBUNIT (Continued)																		
17N/14-101	Clarence A. Heathbrook	Irrigation 6/13/58 - 10/16/58	At pump	Pump test and power records	0	0	0	0	3	14	26	24	14	3	0	0	84	
17N/14-111	Leather A., Martha S., and Leola V. Rich	Irrigation 6/17/58 - 9/12/58	At pump	Pump test and hours of operation	0	0	0	0	0	10	21	22	6	0	0	0	59	
17N/14-131	Charles E. and Helen E. Rietveld	Irrigation and stockwatering 6/15/58 - 9/15/58	At pump	Pump test and power records	0	0	0	0	0	14	23	22	4	0	0	0	61	
17N/14-102	Presley D. Tryon	Irrigation 7/10/58 - 9/18/58	At pump	Pump test and power records	0	0	0	0	0	0	6	4	3	0	0	0	13	
17N/14-111	Pelican Bay Construction Services, Inc.	Industrial 4/1/58 - 12/31/58	At pump	Estimated	0	0	0	0	0	0	0	0	0	0	0	0	100	
17N/14-112	Murray Tryon	Irrigation 7/13/58 - 9/14/58	At pump	Pump test and power records	0	0	0	0	0	0	17	36	8	0	0	0	61	
17N/14-141	Elmer Huffman Margaret Wakefield	Irrigation 5/19/58 - 10/8/58	At pump	Pump test, power records, and hours of operation	0	0	0	0	2	9	14	14	8	1	0	0	48	
17N/14-142	Charles A. Wiley	Irrigation and stockwatering 5/4/58 - 9/13/58	At pump	Pump test and hours of operation	0	0	0	0	2	3	3	3	0	0	0	0	11	
18N/14-141	Robert A. and Elizabeth C. Hastings Robert H. and Bernice C. Stanburst	Irrigation 5/11/58 - 7/27/58	At pump	Sprinkler ratings and hours of operation	0	0	0	0	4	4	4	0	0	0	0	0	12	
18N/14-1701	Clara B. Arogon	Irrigation 5/8/58 - 8/24/58	At pump	Pump test and hours of operation	0	0	0	0	3	5*	3*	3	0	0	0	0	14	Part of amounts diverted in months of June and July is estimated.
18N/14-1701	Clara B. Brown	Irrigation and stockwatering 4/24/58 - 10/23/58	At pump	Pump test and power records	0	0	0	0	2	13	32	11	6	2	0	0	66	
18N/14-1701	Reservation Ranch	Irrigation	At pump	Pump test and estimated hours of operation	0	0	0	0	1	1	2	1	1	0	0	0	6	
18N/14-171	Reservation Ranch	Irrigation 11/3/58 - 11/30/58	At pump	Pump test and power records	0	0	0	0	0	8	30	27	13	4	0	0	82	
18N/14-172	Reservation Ranch	Irrigation and stockwatering 5/7/58 - 9/24/58	At pump	Pump test and power records	0	0	0	0	2	2	10	12	4	0	0	0	30	
18N/14-171	Reservation Ranch	Irrigation and stockwatering 5/1/58 - 9/22/58	At pump	Pump test and power records	0	0	0	0	4	15	50	3	12	0	0	0	124	

* See remarks
- NR - No record for period indicated.
** - Overrun estimated for period indicated.

TABLE 7 (Continued)
MONTHLY RECORDS OF SURFACE WATER DIVERSIONS
SMITH RIVER HYDROGRAPHIC UNIT
1958

Location number	Diversion name or owner	Use	Point of measurement or estimate	Method of observation and calculation	Amount diverted, in acre-feet												Remarks	
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		Total
SMITH RIVER PLAIN SUBUNIT (Continued)																		
18N/14-51	Robert A. Jarline, Jr.	Irrigation and stockwatering 5/24/58 - 10/24/58	At pump	Pump test and power records	0	0	0	0	0	1	5	14	10	1	0	0	33	
18N/14-52	Reservatim Ranch	Irrigation	At pump	Pump test and hours of operation	0	0	0	0	0	0	5	10	9	3	0	0	27	
SOUTH FORK SUBUNIT																		
18N/14-53	Collis McClelland	Mineral 1/1/58 - 4/30/58	Point of use	Estimated	-	-	-	-	-	0	1	1	1	1	0	0	20*	Reported amount diverted is that used from storage tank. An undetermined amount was diverted through the system above this point.
WILSON CREEK SUBUNIT																		
(No diversions located in this subunit)																		
WINCHUCK RIVER SUBUNIT																		
18N/14-54	Ray M. and Mable L. Scrubbing	Irrigation 5/23/58 - 10/4/58	At pump	Pump test and power records	0	0	0	0	1	5	9	6	4	2	0	0	27	
18N/14-55	William D. and Mary J. Flower	Irrigation 5/16/58 - 9/4/58	At pump	Pump test and hours of operation	0	0	0	0	2	1	6	3	1	0	0	0	13	

* See remarks.

The total consumptive use of applied water, in the Smith River Hydrographic Unit, from both surface and ground sources, is estimated to have been about 4,000 acre-feet in 1958. Of this total, about 1,600 acre-feet were consumed by irrigation, 1,000 by municipal and domestic uses, and the remainder by lumber mill operations. Consumptive use of applied water for other purposes was negligible.

TABLE B
INDEX TO SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Diversion name and/or owner	Location number	Subunit	References	
			Plate 2 sheet no.	Text and appendixes page nos
Aller Placer Mines	19N/5E-34G1	Illinois River	2	29, C-13
Brogan, Clara B.	18N/1W-27C1	Smith River Plain	1	34, 41, 54
	18N/1W-27D1	Smith River Plain	1	34, 41, 54, C-12
Cal-Ore Veneer, Inc.	16N/1W-9L1	Smith River Plain	5	31, 40
	16N/1W-9P1	Smith River Plain	5	31, C-10
Coughlan, Charles R. Weller, Nina G.	17N/2E-20R1 see also Upper Field Gulch Ditch	Middle Fork	3	24, 29, C-13, D-3
Crescent City, City of	16N/1W-19J1	Smith River Plain	5	24, 31, 40
	16N/1W-20K1	Smith River Plain	5	24, 32, 40, C-13
	16N/1W-21C1	Smith River Plain	5	24, 32, 40, C-10
	17N/1W-13B1	Smith River Plain	3	24, 26, 33, C-14
Cunningham, Ken D.	16N/1W-10A1	Smith River Plain	5	31, 40, 53
DeMartin, M. L.	19N/1W-33D1	Winchuck River	1	35, 39, 55
Dillman, Charles E.	16N/1W-8Q1	Smith River Plain	5	31, 40, 53
Dixon, Freda	see Douglas Park Water System			
Douglas Park Water System Dixon, Freda Garrison, Bertha Giacomini, Alvin and Dorothy Gooch, Harry, et ux. Powell, Tracy and Pauline Rodriguez, Ernest Savage, W. A., et ux. Shicara, George and Gerry Sisley, Frank and Claire Welch, Jack and Ann	16N/1E-16A1	Smith River Plain	5	31, C-13
Dutton, A. C., Lumber Corporation	16N/1W-28B1	Smith River Plain	5	32, 40, C-10
Endert, B. C.	see Upper Field Gulch Ditch			
English, C. L. Short, Arlet	16N/1W-3L2	Smith River Plain	5	31, 40, 53, C-14
Fisher, William D. and Mary J.	18N/1W-5H1	Winchuck River	1	35, 42, 55, C-11
Fletcher, E. W. Tuttle, Charles	17N/3E-8R1	Middle Fork	4	29, C-13
Forty-first District Agricultural Association	16N/1W-20R1	Smith River Plain	5	32
Freeman, Wilson and May L.	15N/2E-13Q1	South Fork	7	34, 54, C-14
Garrison, Bertha	see Douglas Park Water System			
Gasquet Mutual Water Company	17N/2E-19G1	Middle Fork	3	24, 29, C-13
Giacomini, Alvin and Dorothy	see Douglas Park Water System			

TABLE 8 (Continued)
INDEX TO SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Diversion name and/or owner	Location number	Subunit	References	
			Plate 2 sheet no.	Text and appendixes page nos
Gooch, Harry, et ux.	see Douglas Park Water System			
Hastings, Robert K. and Elizabeth C. Stanhurst, Robert H. and Bernice C.	18N/1W-21R1	Smith River Plain	1	33, 41, 54, C-12
Huffman, C. F. and Marie	15N/1E-6B1	Mill Creek	7	30, 53, C-10
	15N/1E-6P1	Mill Creek	7	30, 53, C-10
	15N/1E-7B1	Mill Creek	7	30, 53, C-10
	15N/1E-7G1	Mill Creek	7	30, 53, C-10
	16N/1E-31R1	Mill Creek	5	30, 53
	16N/1W-3L1	Smith River Plain	5	31, 53
Huffman, Elinor Wakefield, Margaret	17N/1W-12M1	Smith River Plain	3	33, 41, 54, C-10
Hunter, Austin S.	17N/1W-34D1	Smith River Plain	3	33, 54
Russey Ranch Corporation	17N/1E-30J1	Smith River Plain	3	32
Johnston, Elmer E. and Pearl A.	17N/4E-5F1	Middle Fork	4	29, C-11
McClendon, Collins	15N/2E-28R1	South Fork	7	34, 42
McNamara and Peepe Lumber Company	16N/1W-28C1	Smith River Plain	5	32, 40
Medford Veneer and Plywood Corp.	16N/1W-14R1	Smith River Plain	5	31, 40, C-10
Moore, Robert H.	18N/2E-5J1	North Fork	1	30, C-10
Northern California Plywood, Inc.	16N/1W-18C1	Smith River Plain	5	31, 40, C-10
Nunneley, Rollis J. and Jean	see Trout Haven			
Owen, William K.	18N/1W-23G1	Rowdy Creek	1	24, 30
	18N/1W-23G2	Rowdy Creek	1	24, 30
Pelican Bay Construction Services, Inc.	17N/1W-11H1	Smith River Plain	3	33, 41
Powell, Tracy and Pauline	see Douglas Park Water System			
Raymond, Howard E. and Minnie	17N/3E-9M1	Middle Fork	4	29, C-14
Rellim Redwood Company	see Huffman, C. F. and Marie. diversions in Mill Creek Subunit			
Reservation Ranch	18N/1W-27D2	Smith River Plain	1	34, 41, 54
	18N/1W-27F1	Smith River Plain	1	34, 41, 54
	18N/1W-27F2	Smith River Plain	1	34, 41, 54
	18N/1W-27L1	Smith River Plain	1	34, 41, 54
	18N/1W-28K1	Smith River Plain	1	34, 42, 54
Riley, Charles W.	17N/1W-34P1	Smith River Plain	3	33, 41, 54

TABLE 8 (Continued)
INDEX TO SURFACE WATER DIVERSIONS IN
SMITH RIVER HYDROGRAPHIC UNIT

Diversion name and/or owner	Location number	Subunit	References	
			Plate 2 sheet no.	Text and appendixes page nos.
Rodriguez, Ernest	see Douglas Park Water System			
Sarina, Robert G., Sr.	18N/1W-27Q1	Smith River Plain	1	34, 42, 54
Savage, W. A., et ux.	see Douglas Park Water System			
Shicara, George and Gerry	see Douglas Park Water System			
Short, Arlet	see English, C. L.			
Sisley, Frank and Claire	see Douglas Park Water System			
Standard Veneer and Timber Co.	16N/1W-9M1	Smith River Plain	5	31
Stanhurst, Robert H. and Bernice C.	see Hastings, Robert K.			
Struebing, Ray W. and Mable H.	18N/1W-5G1	Winchuck River	1	35, 42, 55, C-11
Trout Haven Nunnely, Hollis J. and Jean	17N/3E-3R1	Middle Fork	4	26, 29, C-11
Tryon, Murray	17N/1W-11H2	Smith River Plain	3	33, 41, 54
Tryon, Presley D.	17N/1W-10G1	Smith River Plain	3	33, 41, 54
	17N/1W-11F1	Smith River Plain	3	33, 54
	17N/1W-11F2	Smith River Plain	3	33, 54
Tuttle, Charles	see Fletcher, E. W.			
Ulrich, Lester A., Martha S. and Lewis	17N/1W-2L1	Smith River Plain	3	32, 41, 53, C-11
Upper Field Gulch Ditch Coughlan, Charles R. Endert, B. C. Weller, Nina G.	17N/2E-2OR2	Middle Fork	3	24, 29, C-13, D-4
Wakefield, Margaret	see Huffman, Elinor			
Welch, Jack and Ann	see Douglas Park Water System			
Weller, Nina G.	see Coughlan, Charles R. and Upper Field Gulch Ditch			
West Coast Veneer Company and Lund Plywood and Manufacturing Company	16N/1W-21E1	Smith River Plain	5	32, 40
	16N/1W-21E2	Smith River Plain	5	32, C-14
Westbrook, Clarence W.	17N/1W-2E1	Smith River Plain	3	32, 41, 53
Wetherell, Charles E. and Helen E.	17N/1W-3H1	Smith River Plain	3	33, 41, 54
Wieting, Carl A.	18N/4E-2C1	Illinois River	2	29, C-14

CHAPTER III. LAND USE

The results of a survey of water uses and water facilities in the Smith River Hydrographic Unit were presented in Chapter II. In this chapter are reported the results of a survey of present land uses as related to water use. Also included is a brief summary of historical conditions. A thorough knowledge of the nature and extent of land and water uses under existing conditions within this hydrographic unit is one of the primary requisites in evaluating future water requirements within the unit.

Historical Land Use

As previously noted, the beginning of the development of the Smith River Hydrographic Unit took place in the 1850's. Of the three broad groups of land use--agricultural, urban, and recreational--agricultural and urban uses began over 100 years ago. It was some 30 or 40 years later that certain areas were developed specifically for recreation.

Agricultural development on the Smith River Plain began during its original settlement period in the 1850's, and very soon became a major activity. After a somewhat experimental period of about 25 years, crop patterns remained fairly constant, except for gradual growth, until the present. To illustrate conditions in the early years, about 2,200 acres of land were under cultivation in 1857, of which some 1,700 acres were planted to small grains. As dairying started to develop in about 1875, pasture began to replace grain as the predominant agricultural crop. The resulting crop pattern is represented by 1958 conditions, when some 80 percent of the agricultural land was devoted to pasture and only 7 percent to grain.

Two other significant changes in the agricultural picture have taken place since 1940. These are the introduction of irrigation, and the

commercial production of bulbs and flowers. In 1940 there were only two irrigated farms, but by 1950 there were 35. The total area irrigated in 1949 was about 1,900 acres. By 1958 about 3,600 acres, or 45 percent of the cultivated lands, were irrigated. During the 1950's, the bulb and flower industry expanded rapidly, and the income from these products has grown to equal that from all other agricultural activities, although in 1958 these crops occupied only about 5 percent of the total cultivated area within the unit.

From the time of its founding, Crescent City has been the principal urban center, serving an area extending well beyond the limits of the hydrographic unit. Smaller towns within the unit have developed more slowly. The post-World War II period has, with its general trend to suburbanization, seen a rapid expansion of the scattered small residential communities. The industrial uses of land are mainly for sawmills and related activities. Though present in the early years, these uses have increased sharply in the last decade. The population figures given previously indicate this increase of urban land use over the years.

Recreational activities, mainly fishing and hunting, have been popular in the Smith River area since its early history. For years the natural terrain served the needs, but about 1890 certain specific areas became popular for their recreational value. The building of summer homes, resorts, and improved campgrounds began about this time. In recent years, several areas, such as parts of Jedediah Smith Redwoods State Park, have been developed for intensive recreational use.

Present Land Use

A detailed survey of land uses in the Smith River Hydrographic Unit was conducted in 1958 as part of this investigation. The land uses mapped

in this survey as related to water use fall into five categories: irrigated lands, dry-farmed lands, urban lands, recreational lands, and naturally high water table lands, such as natural meadowlands and marshes. Lands not falling into any of these five categories were mapped as native vegetation. The various types of land use mapped in 1958 are delineated on Sheets 1 through 10 of Plate 2. The acreages of land uses within each subunit are presented in Table 9. The values represent gross acreages, including nonwater-service areas such as roads, ditches, building and storage areas, and miscellaneous rights-of-way, which occur within the mapped areas.

Methods and Procedures

The land use survey and the location of surface water diversions were accomplished by relating field observations to aerial photographs having a scale of about 1:20,000. Stereoscopes were used to assist in the field mapping procedure. As each point of diversion was located, it was plotted on the aerial photograph and as the use and extent of each parcel of land was determined, these were delineated on the aerial photograph. The hydrographic unit was traversed by automobiles as completely as roads and terrain permitted. When necessary because of poor accessibility, inspections were made on foot. An example of an aerial photograph with land use data delineated on it is shown on Page 51.

After completion of the field mapping, the data delineated on the photographs were transferred to copies of U. S. Geological Survey quadrangle maps reproduced at a scale of 1:24,000. This procedure was necessary to bring the delineated areas to a common scale for accurate determination of acreages, since the scale of the aerial photographs utilized varied widely. A series of these maps, showing all diversions and the fields associated

TABLE 9
LAND USE IN
SMITH RIVER HYDROGRAPHIC UNIT, 1958
(In acres)

Subunit and County	Irrigated lands	Naturally high water table lands		Dry-formed lands	Urban lands	Recreational lands			
		Meadowlands	Marsh			Residential	Commercial	Camp sites	Parks
Illinois River	0	20	0	0	0	0	10	20	0
Middle Fork	0	0	0	10	190	30	20	50	0
Mill Creek	80	0	0	0	0	0	0	0	5,300
North Fork	0	0	0	0	0	0	0	0	0
Rowdy Creek	0	0	0	0	60	0	0	0	0
Smith River Plain	3,340	3,850	360	4,370	4,160	20	10	0	6,660
South Fork	40	10	0	0	0	10	10	0	0
Wilson Creek	0	0	0	10	30	0	0	0	3,530
Winchuck River	<u>150</u>	<u>0</u>	<u>0</u>	<u>100</u>	<u>130</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>10</u>
Total	3,610	3,880	360	4,490	4,570	60	50	70	15,500

with each irrigation diversion, was colored according to the land use categories, and then reviewed by local parties concerned. These work maps were then used in the preparation of Plate 2.

Another series of these maps was used in computing the acreages of the land uses. Each delineated area on these maps was manually cut out and carefully weighed on an analytical balance. These weights were converted to acreages, using ratios determined for each of the individual maps. This method has proven to be a very expedient and accurate means of area determination where a large number of small parcels are involved.

Irrigated Lands

Irrigated lands, as designated in this report, include all agricultural lands which receive water artificially applied. Acreages of irrigated lands are reported in Table 10 by surface water diversion and by subunits, showing the crops grown. The lands on which ground water was used, as well as those receiving both surface and ground water, were so noted. These irrigated lands were segregated into pasture, truck crops, and idle and fallow irrigated lands. Pasture was further subdivided into "mixed" and "native." Idle irrigated lands are those lands which were not irrigated in the year of survey, but which had been irrigated within the preceding three years. Fallow irrigated lands are those cultivated lands which may have been irrigated during the year of survey, but which at the time of survey were only tilled and not planted to a crop. Of the 3,600 acres of irrigated lands mapped in 1958, 78 percent were in pasture-type crops; 11 percent were in truck crops, mainly bulbs and flowers; and the remainder was composed of idle and fallow lands.

The irrigated lands were identified on the work maps by diversion service area and by crops irrigated, but on Plate 2 they are grouped into just two categories: (1) those lands which received a full irrigation during

TABLE 10
IRRIGATED LANDS IN
SMITH RIVER HYDROGRAPHIC UNIT
1958 (in acres)

Location number	Diversion owner	Pasture		Bulbs and flowers	Total lands irrigated	Irrigated idle or fallow ^a	Total
		Mixed	Native				
<u>H B & M</u>	<u>ILLINOIS RIVER AND MIDDLE FORK SUBUNITS</u>						
	(No diversions located in these subunits)						
	<u>MILL CREEK SUBUNIT</u>						
15N/1E-6B1	C. F. and Marie Huffman				0	9	9
15N/1E-6P1	C. F. and Marie Huffman				0	3	3
15N/1E-7B1	C. F. and Marie Huffman				0	14	14
15N/1E-7G1	C. F. and Marie Huffman				0	16	16
16N/1E-31R1	C. F. and Marie Huffman	—	—	—	0	36	36
Total Mill Creek Subunit		0	0	0	0	78	78
	<u>NORTH FORK AND ROWOY CREEK SUBUNITS</u>						
	(No diversions located in these subunits)						
	<u>SMITH RIVER PLAIN SUBUNIT</u>						
16N/1W-3L1	C. F. and Marie Huffman				0	43	43
16N/1W-3L2	C. L. English and Arlet Short	10		14	24		24
16N/1W-8Q1	Charles E. Dillman	14			14		14
16N/1W-10A1	Ken D. Cunningham	27			27		27
17N/1W-2E1	Clarence W. Westbrook	146			146		146
17N/1W-2L1	Lester A., Martha S., and Lewis Ulrich	102			102	11	113

^aFor lettered footnotes, see last page of table.

TABLE 10 (Continued)
IRRIGATED LANDS IN
SMITH RIVER HYDROGRAPHIC UNIT
1958 (in acres)

Location number	Diversion owner	Pasture		Bulbs and flowers	Total lands irrigated	Irrigated idle or fallow ^a	Total
		Mixed	Native				
<u>H B & M</u>	<u>SMITH RIVER PLAIN SUBUNIT (Continued)</u>						
17N/1W-3H1	Charles E. and Helen E. Wetherell	140			140		140
17N/1W-10G1	Presley D. Tryon	28		24	52	52	104
17N/1W-11F1	Presley D. Tryon	65			65		65
17N/1W-11F2	Presley D. Tryon				0	108	108
17N/1W-11H2	Murray Tryon	162			162		162
17N/1W-12M1	Elinor Huffman and Margaret Wakefield	98			98		98
17N/1W-34D1	Austin S. Hunter				0	44	44
17N/1W-34P1	Charles W. Riley	15		8	23		23
18N/1W-21R1	Robert K. and Elizabeth C. Hastings Robert H. and Bernice C. Stanhurst		35	38	73 ^c		73 ^c
18N/1W-27G1	Clara B. Brogan			14	14		14
18N/1W-27D1	Clara B. Brogan	72		13	85		85
18N/1W-27D2 18N/1W-27F2	Reservation Ranch			12	12		12
18N/1W-27F1	Reservation Ranch	88			88	18	106
18N/1W-27F2	Reservation Ranch	31			31		31
18N/1W-27L1	Reservation Ranch	89		17	106		106
18N/1W-27Q1	Robert G. Sarina, Sr.	48			48	18	66
18N/1W-28K1	Reservation Ranch	26			26		26
Lands irrigated by ground water		<u>1,422^b</u>	<u>49</u>	<u>210^d</u>	<u>1,681</u>	<u>32</u>	<u>1,713</u>
Total Smith River Plain Subunit		2,583 ^b	84	350 ^d	3,017	326	3,343
	<u>SOUTH FORK SUBUNIT</u>						
15N/2E-13Q1	Wilson and May L. Freeman	—	39	—	39	—	39
Total South Fork Subunit		0	39	0	39	0	39

For lettered footnotes, see last page of table.

TABLE 10 (Continued)
IRRIGATED LANDS IN
SMITH RIVER HYDROGRAPHIC UNIT
1958 (in acres)

Location number	Diversion owner	Pasture		Bulbs and flowers	Total lands irrigated	Irrigated idle or fallow ^a	Total
		Mixed	Native				
<u>H B & M</u>		<u>WILSON CREEK SUBUNIT</u>					
		(No diversions located in this subunit)					
		<u>WINCHUCK RIVER SUBUNIT</u>					
18N/1W-5G1	Ray W. and Mable H. Struebing		48	23	71		71
18N/1W-5H1	William D. and Mary J. Fisher	32	22	15	69		69
19N/1W-33D1	M. L. DeMartin	2			2		2
Lands irrigated by ground water		<u>0</u>	<u>0</u>	<u>12</u>	<u>12</u>	<u>0</u>	<u>12</u>
Total Winchuck River Subunit		34	70	50	154	0	154
		<u>SUMMARY</u>					
Lands irrigated by surface water		1,195	144	178	1,517 ^c	372	1,889 ^c
Lands irrigated by ground water		1,422 ^b	49	222 ^d	1,693	32	1,725
TOTAL SMITH RIVER HYDROGRAPHIC UNIT		2,617	193	400 ^d	3,210	404	3,614

- a - Lands ordinarily irrigated, but idle or fallow in 1958.
b - Includes 41 acres of alfalfa.
c - 73 acres received supplemental supply from ground water.
d - Includes 8 acres of other truck crops.

the year of survey, and (2) those lands usually irrigated but which were idle or fallow in 1958. In most hydrographic units, a third category is usually present, namely, those lands which received only a partial irrigation because of insufficient water supply. However, in 1958 no such condition was found in the Smith River Hydrographic Unit.

Naturally High Water Table Lands

In addition to the lands which receive applied water as described above, there are lands supporting vegetation which utilize water from a naturally high water table, such as mountain meadows or lands adjacent to lakes and streams. These are shown on Plate 2 as "naturally irrigated meadowlands" and "marshes and swamps" and are listed in Table 9 as "meadowlands" and "marsh."

Dry-farmed Lands

Dry-farmed lands are those lands normally planted to a crop but which do not receive applied water. This category includes all lands so farmed, even if they were "idle" or "fallow" during the year of survey. Dry-farmed lands are called "idle" if entirely uncultivated in the year of survey, and "fallow" if tilled but without a crop. Lands which had been idle for more than three years and appeared to have reverted to "native vegetation" were so mapped.

It should be noted that the term "dry-farmed" as used herein refers to the farming practice on these lands and not to a lack of soil moisture.

Since noncultivated rangelands are usually indistinguishable from lands with native cover not used for grazing purposes, both types are included in "native vegetation." Water use in both cases is essentially the same and is dependent upon precipitation.

grazing
lily Herd
on
th River
Plain



Easter
Lily Field
along
Del Norte
Coast

Urban Lands

Urban lands include the total areas of cities, towns, small communities, industrial plots, and military reservations which are large enough to be delineated. Also included are parks, golf courses, racetracks, and cemeteries within or near urban areas. The acreages represent gross delineations, including streets and vacant lots, and are therefore not necessarily fully developed at the present time. In this survey the boundaries of urban communities were delineated to include all lands with a density of one house or more per two acres. Military reservations are included in their entirety, regardless of the extent of development.

Recreational Lands

Recreational lands were mapped on aerial photographs in the field in four categories: (1) residential, (2) commercial, (3) camp and trailer sites, and (4) parks. Recreational residential lands include permanent and summer home tracts within primarily recreational areas. The estimated density of homes per acre was also indicated. Recreational commercial lands include those containing motels, resorts, hotels, stores, restaurants, and similar commercial establishments in primarily recreational areas. Lands mapped in the camp and trailer sites category include those areas so used within primarily recreational areas outside the boundaries of parks. The entire area within the boundaries of parks was included in the parks category, without regard to the extent of development thereon. Obviously, nearly all of the mountainous, seashore, and water surface areas are suitable for some use, such as hunting, fishing, hiking, picnicking, and other recreational activities of this nature. For the purpose of this land use survey, however, consideration is given only to those lands where some type of development requiring water service occurs, except in the case of parks.

The recreational lands are tabulated by the above four categories in Table 9. However, all recreational lands are combined into one group on Plate 2. As mentioned above, in some cases the areas delineated and tabulated are not necessarily fully developed. Designated recreational areas such as Jedediah Smith Redwoods State Park and military reservations are the most notable examples of this.

Native Vegetation

Lands which are essentially in a native state, and not included in any of the above categories, as well as scattered residences and other isolated uses too small to be delineated, were mapped as "native vegetation." However, in addition to the lands so mapped, the total acreage reported in this native vegetation category includes lands which were mapped as water surface and farm building areas, including dairies, feed lots, etc. The total of all these lands was some 466,000 acres or about 94 percent of the Smith River Hydrographic Unit in 1958. Most of these lands, even in their native state, are used for commercial timber production, livestock range, and recreational activities such as fishing, hunting, hiking, and picnicking.

CHAPTER IV. LAND CLASSIFICATION

Calculations of future water requirements will be based in a large part on a classification of lands with regard to their potential for irrigated agriculture and recreational development. The results of such a land classification conducted in the Smith River Hydrographic Unit are presented in this chapter.

Lands were not classified in this survey with respect to their potential for urban development. The use of lands for urban purposes is closely related to population at any given time, and it is planned to defer designation of these lands until estimates of population and related economic studies are made in connection with determinations of future water requirements.

The former Division of Water Resources made a reconnaissance classification of lands of the State which was reported in State Water Resources Board Bulletin No. 2, "Water Utilization and Requirements of California," June 1955. In that report, the area of the Smith River Hydrographic Unit is contained in the "Del Norte" and a part of "Rogue River" units. The data on agricultural lands reported herein are in considerably greater detail than the information in Bulletin No. 2. This bulletin also includes additional data on classification of recreational lands not contained in Bulletin No. 2.

Methods and Procedures

The general methods and procedures used in field mapping and tabulation of information were essentially the same as those described for the land use survey in Chapter III. An example of land classification delineations on an aerial photograph is shown on page 66.

The standards used in the classification of lands are given in detail in Table 11.

TABLE 11

LAND CLASSIFICATION STANDARDS

Land Class:	Characteristics
Symbol :	
<u>Irrigable Lands</u>	
V -	These lands are level or slightly sloping and vary from smooth to hummocky or gently undulating relief. The maximum allowable slope is 6 percent for smooth, reasonably large-sized bodies lying in the same plane. As the relief increases and becomes more complex, lesser slopes are allowed. The soils have medium to deep effective root zones, are permeable throughout, and free of salinity, alkalinity, rock, or other conditions limiting crop adaptability of the land. These lands are suitable for all climatically adapted crops.
H -	These are lands with greater slope and/or relief than those of the V class. They vary from smooth to moderately rolling or undulating relief. The maximum allowable slope is 20 percent for smooth, reasonably large-sized bodies lying in the same plane. As the relief increases and becomes more complex, lesser slopes are allowed. The soils are permeable, with medium to deep effective root zones, and are suitable for the production of all climatically adapted crops. The only limitation is that imposed by topographic conditions.
M -	These are lands with greater slope and/or relief than those of the H class. They vary from smooth to steeply rolling or undulating relief. The maximum allowable slope is 30 percent for smooth, reasonably large-sized bodies lying in the same plane. As the relief increases and becomes more complex, lesser slopes are allowed. The soils are permeable, with medium to deep effective root zones, and are suitable for the production of all climatically adapted crops. The only limitation is that imposed by topographic conditions.

Any variation in the foregoing, as defined, is indicated by use of one or more of the following symbols:

- w - Indicates the presence of a high water table, which in effect limits the present crop adaptability of these lands to pasture crops. Drainage and a change in irrigation practice would be required to affect the crop adaptability.
- s - Indicates the presence of an excess of soluble salts, or exchangeable sodium in slight amounts, which limits the present adaptability of these lands to crops tolerant to such conditions. The presence of salts within the soil generally indicates poor drainage and a medium to high water table. Reclamation of these lands will involve drainage and the application of small amounts of

TABLE 11 (Continued)

LAND CLASSIFICATION STANDARDS

Land Class: Symbol :	Characteristics
	amendments and some additional water over and above crop requirements in order to leach out the harmful salts.
ss -	Indicates the presence of an excess of soluble salts or exchangeable sodium in sufficient quantity to require the application of moderate amounts of amendments and some additional water over and above crop requirements in order to effect reclamation.
h -	Indicates very heavy textures, which make these lands best suited for production of shallow-rooted crops.
l -	Indicates fairly coarse textures and low moisture-holding capacities, which in general make these lands unsuited for the production of shallow-rooted crops because of the frequency of irrigations required to supply the water needs of such crops.
p -	Indicates shallow depth of the effective root zone, which limits use of these lands to shallow-rooted crops.
r -	Indicates the presence of rock on the surface or within the plow zone in sufficient quantity to prevent use of the land for cultivated crops.

Urban Lands

- UD - The total area of cities, towns, and small communities presently used for residential, commercial, recreational and industrial purposes.

Recreational Lands

- RR - Existing and potential permanent and summer home tracts within a primarily recreational area. The estimated number of houses, under conditions of full development, is indicated by a number in the symbol, i.e., RR-3 is suitable for three houses per acre.
- RC - Existing and potential commercial areas which occur within a primarily recreational area and which include motels, resorts, hotels, stores, etc.
- RT - Existing and potential camp and trailer sites within a primarily recreational area.
- P - Existing and potential county, state, federal, and private parks, racetracks, and fairgrounds.

TABLE 11 (Continued)

LAND CLASSIFICATION STANDARDS

Land Class: Symbol :	Characteristics
<u>Miscellaneous Lands</u>	
F -	Presently forested lands, or lands subject to forest management, which meet the requirements for irrigable land, but which, because of climatic conditions and physiographic position, are better suited for timber production or some type of forest management program rather than for irrigated agriculture.
Vm -	Swamp and marsh lands which are covered by water most of the time and usually support a heavy growth of phreatophytes.
N -	Includes all lands which fail to meet the requirements of the above classes.

Major Categories of Land Classes

The lands mapped can be grouped into four major categories:

(1) irrigable lands, (2) urban lands, (3) recreational lands, and (4) miscellaneous lands: irrigable lands deemed best suited to remain under forest or range management, marshlands, and all those lands which fail to meet the requirements of the first three land class categories.

Irrigable Lands

Irrigable lands are grouped in appropriate classifications according to their suitability for development under irrigated agriculture, and their crop adaptability. Presently irrigated lands are included within these classifications, but developed urban lands and recreational lands are not classed as to irrigability. The time element with respect to when the lands might be developed did not enter the determination, except that suitability for irrigated agriculture was necessarily considered in light of present agricultural technology.

There are many factors which influence the suitability of land for irrigation development. Since soil characteristics and the physiography of the landscape are the most stable of these factors, they were the only ones considered in the survey in classifying lands as to their irrigability. The characteristics of the soils were established by examination of road cuts, ditchbanks, and material from test holes, together with observations of the type and density of native vegetation and crops. Representative slopes throughout the area were measured with a clinometer. Other aspects, such as those economic factors related to the production and marketing of climatically adapted crops, the location of lands with respect to a water supply, and climatic conditions, were not considered in the basic classification. These latter factors are very important in estimating the nature of future cropping patterns and practices, and will be given due consideration when estimates are made of future water requirements.

Urban Lands

It is recognized that future urban expansion will encroach upon some of the irrigable lands. The location and extent of this type of development is a function of many variables. Because this land classification survey is an inventory of relatively unchanging physical conditions, no attempt was made to locate the areas of urban encroachment. Therefore, only those lands devoted to urban uses in 1958 are designated as "urban" lands.

Recreational Lands

Present trends indicate an expanding rate of use and demand for recreational facilities throughout the State. In view of these trends and the ever-increasing population, it is recognized that there will be a demand for substantial land areas for recreational purposes. This is particularly



Example of Land Classification Delineated on Aerial Photograph.

(See Table 11, Page 62 for symbol explanation)

true of the mountainous and coastal regions where this type of development is expanding rather rapidly at the present time.

Generally speaking, all mountainous and coastal lands are suitable for some recreational use, such as hunting, fishing, and similar outdoor activities. However, for purposes of this survey, lands classified for recreational use were limited to those which are now, or may in the future be, used intensively for permanent and summer home tracts, camp and trailer sites, or parks outside of urban areas. These are lands requiring intensive water service.

Primary considerations for classification of home tracts and camp and trailer sites were such physical factors as soil depth, slope, and rockiness; such aesthetic values as view, nearness to lakes, streams or seashore, or density and type of forest canopy suitable for the respective uses; and the plans of national and state forest officials. An important factor in location of camp and trailer sites was the availability of a water supply, but isolation from existing roads did not influence site selection.

The total areas of existing national and state parks, rather than the specific areas of potential intensive development therein, are included with the recreational lands on Plate 3. For other parks, only the areas presently developed to intensive recreational use are delineated. No attempt was made to predict where additional park developments will take place.

Miscellaneous Lands

Two types of lands are included as miscellaneous lands in Table 12. They are designated separately on Plate 3. These are: (1) irrigable forest management lands; and (2) swamp and marshlands.

Campers at
Madrona
Forest
Camp



Swimming
in
Smith River

TABLE 12
CLASSIFICATION OF LANDS IN
SMITH RIVER HYDROGRAPHIC UNIT
(In acres)

Subunit	Irrigable agricultural lands										Urban lands (1958) UD	Recreational lands					Miscellaneous lands		
	Smooth lying			Gently sloping			Steeply sloping					Total	RR	RC	RT	PP	Total	F	Vm
	V	VI	Vw	H	HI	M	MI												
Illinois River	0	0	20	0	0	0	0	20		0	20	50	40	0	110	1,620	0		
Middle Fork	0	0	0	10	0	0	0	10		190	820	100	550	0	1,470	3,820	0		
Mill Creek	0	0	0	560	0	0	0	560		0	0	0	0	5,300	5,300	2,090	0		
North Fork	0	0	0	0	0	0	0	0		0	0	0	100	0	100	980	0		
Rowdy Creek	200	0	0	30	0	20	0	250		60	0	0	70	0	70	880	0		
Smith River Plain	13,150	400	3,850	9,040	490	230	280	27,440		4,160	40	10	0	6,660	6,710	3,850	360		
South Fork	50	0	10	90	0	0	0	150		0	930	10	1,290	0	2,230	4,970	0		
Wilson Creek	120	30	0	10	0	50	0	210		30	0	0	0	3,530	3,530	1,020	0		
Winchuck River	360	0	0	260	0	10	0	630		130	0	0	0	10	10	710	0		
Total	13,880	430	3,880	10,000	490	310	280	29,270		4,570	1,810	170	2,050	15,500	19,530	19,940	360		

Irrigable forest management lands are those forested lands, range lands, or land subject to some type of forest management, having physical conditions making them susceptible to irrigation development, but, because of climatic conditions and physiographic position, are better suited and expected to remain under their present uses.

Swamp and marshlands are those lands which generally have water standing on them, and usually support a heavy growth of tules or other phreatophytes.

Approximately 425,000 acres, or 85 percent of the area of the hydrographic unit, failed to meet the requirements for the irrigable, urban, or recreational classification, or to be included within the two groups of miscellaneous lands described above.

Results of the land classification survey conducted in 1959 are shown on Plate 3, "Classification of Lands," Sheets 1 through 10. The total areas of each classification are listed by subunits in Table 12.

CHAPTER V. SUMMARY

The Smith River Hydrographic Unit comprises 779 square miles (498,600 acres) of Del Norte County in the extreme northwest corner of the State, and includes the watersheds of the Smith River and of the other smaller streams to the north and west of the Klamath River Basin. Over 90 percent of the area of the unit, while not high in elevation (maximum elevation is the 6,400-foot peak of Bear Mountain), is rugged, being cut by numerous canyons and narrow stream valleys. Less than 10 percent is occupied by the 60-square-mile Smith River Plain lying along the Pacific Ocean north of Crescent City. Timber products constitute by far the largest industry and resource of the unit. This industry had its beginning in the 1850's, but has experienced its greatest growth since World War II. Agriculture is the second largest business, with dairy and horticultural products the principal sources of farm income. The portion of farmlands under irrigation has increased from a negligible quantity to nearly half of the cultivated lands in the last 20 years. Of the land irrigated in 1958, about 85 percent was in pasture and the remainder in truck crops. Mineral production (mainly sand and gravel and chromite), recreation, and commercial fishing are the other enterprises of significance in the unit. The center of population, business, and government within the unit is Crescent City. Smaller urban areas are located at Smith River, Fort Dick, and Gasquet.

Water Use

A survey was made of water uses supplied by diversion of surface water during 1958, the objective of which was to locate and obtain data with respect to all diversions of more than 10 acre-feet per year. Continuous or periodic measurements were made on approximately 50 percent of the 62 diversions located in the unit.

Most of these diversions are based on riparian rights or on appropriative rights obtained by application to the State since enactment of the California Water Commission Act of 1914. There are a total of 120 presently valid applications pertinent to surface waters within the unit. Permits or licenses have been granted for 113 of these applications, while the other seven are either pending or incomplete.

Land Use

A detailed land use survey was conducted in the Smith River Hydrographic Unit during 1958 and is summarized as follows:

<u>Use</u>	<u>Area, in acres</u>
Agriculture	
Lands irrigated in 1958	3,210
Lands normally irrigated, but idle or fallow in 1958	400
Naturally high water table lands	3,880
Dry-farmed lands	<u>4,490</u>
	11,980
Urban	4,570
Recreation	
Residential, Commercial and camp sites	180
Parks	<u>15,500</u>
	15,680
Native vegetation	466,010
Marshlands	<u>360</u>
	466,370
TOTAL	498,600

Of the 3,210 acres of land irrigated, 1,450 were irrigated with surface water, 1,690 with ground water, and 70 with surface and ground water combined. Of the 15,490 acres of parks in the unit, approximately 3 percent are actually developed. This is due to the fact that large portions of Jedediah Smith and Del Norte Coast Redwoods State Parks are undeveloped. Figure 2 portrays the land use distribution in the Smith River Hydrographic Unit.

Land Classification

The results of the land classification survey conducted for this investigation are summarized below:

<u>Classification</u>	<u>Area, in acres</u>
Irrigable agricultural lands	29,290
Irrigable forest management lands	19,940
Present urban lands, 1958	4,570
Recreational lands	19,530
Other lands	<u>425,270</u>
TOTAL	498,600

Approximately 94 percent of the irrigable agricultural lands are located in the Smith River Plain Subunit, about 2 percent each in the Winchuck River and Mill Creek Subunits, and the remaining 2 percent in the other 6 subunits combined. Of the recreational lands, about 80 percent are situated in Smith River Plain, Mill Creek, and Wilson Creek Subunits. The bulk of these lands comprises the Del Norte Coast and Jedediah Smith Redwoods State Parks. Figure 3 portrays the distribution of the land classification in the Smith River Hydrographic Unit.

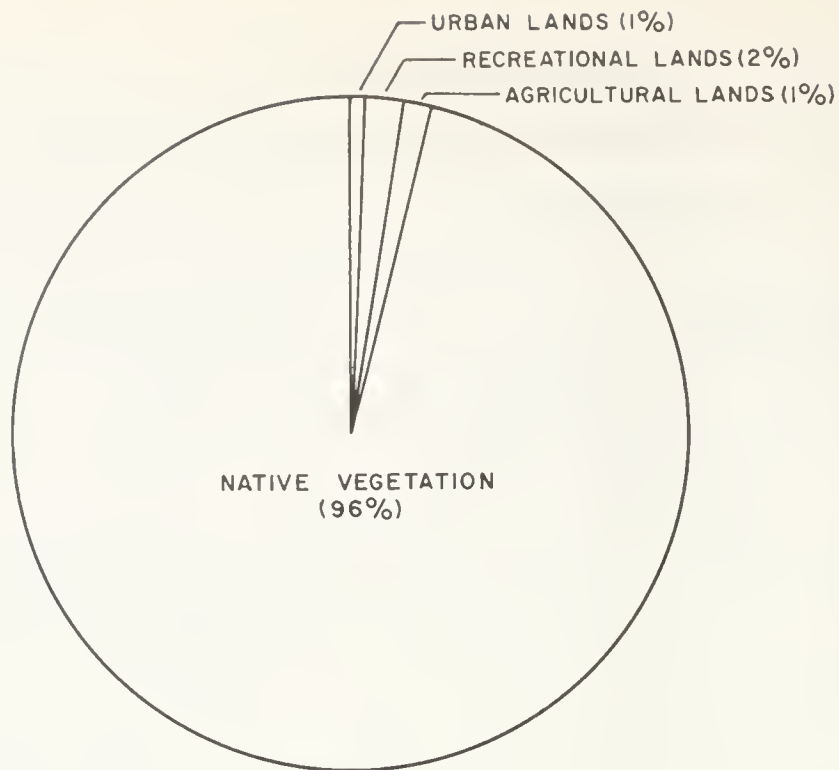


Figure 2
1958 LAND USE

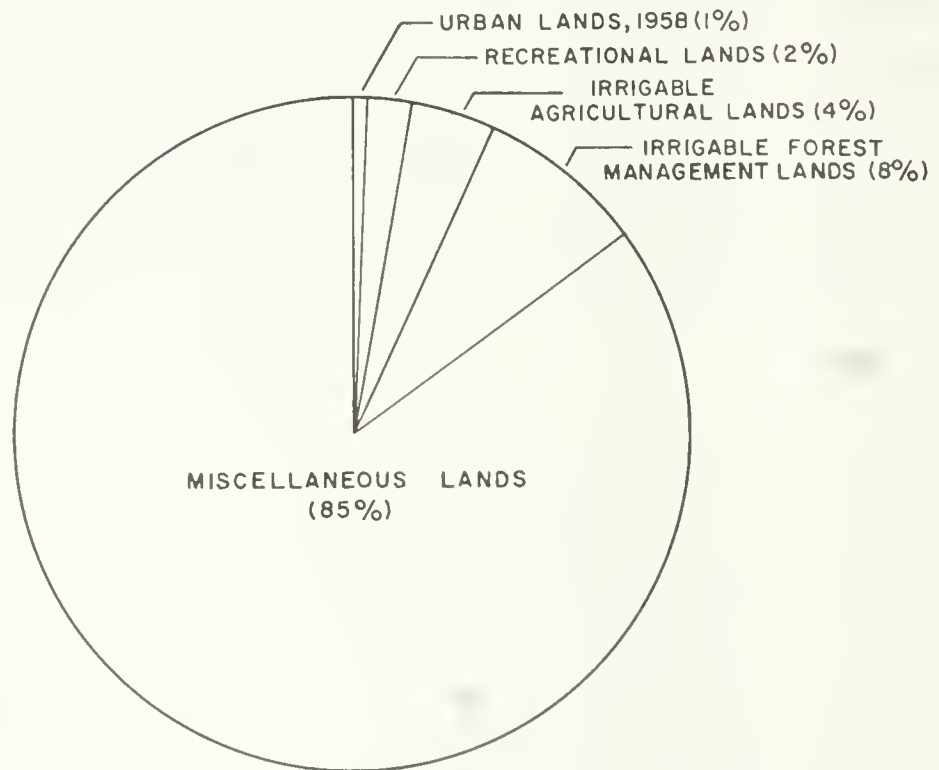


Figure 3
CLASSIFICATION OF LANDS

APPENDIX A

STATEWIDE WATER RESOURCES AND WATER
REQUIREMENTS PROGRAM

APPENDIX A

STATEWIDE WATER RESOURCES AND WATER REQUIREMENTS PROGRAM

California's major water problem today is that of development and delivery of supplemental water supplies to meet increasing water requirements throughout the State. The problem involves (1) the regulation of seasonal and cyclic fluctuation of streamflow to meet demand schedules in the areas of origin, and (2) the transmission of regulated surplus flows over long distances to areas of deficiency. The development and long-distance transfer of water is currently accomplished by such major facilities as the federal Central Valley Project and the Colorado River Aqueduct of The Metropolitan Water District of Southern California. However, such development and transfer will be considerably broadened in scope by the State Water Facilities.

Consumptive water requirements of the State on a basin-wide basis were estimated in State Water Resources Board Bulletin No. 2, "Water Utilization and Requirements of California," June 1955. However, to provide for local water needs while considering specific export projects, more detailed information must be made available on present and projected future water requirements of the areas in which the projects are to be built. This will necessitate the considerably more detailed collection and analysis of data on hydrology, land use and land capability, and economics.

Recognizing that additional information is needed if the water needs of areas of origin are to be adequately protected in large-scale water development projects, the 1956 Legislature authorized an investigation to determine the water resources and water requirements of the respective watersheds in the State.

"232. The Legislature finds and declares that in providing for the full development and utilization of the water resources of this State it is necessary to obtain for consideration by the Legislature and the people, information as to the water which can be made available for exportation from the watersheds in which it originates without depriving those watersheds of water necessary for beneficial uses therein. To this end, the department is authorized and directed to conduct investigations and hearings and to prepare findings therefrom and to report thereon to the Legislature at the earliest possible date with respect to the following matters:

(a) The boundaries of the respective watersheds of the State and the quantities of water originating therein;

(b) The quantities of water reasonably required for ultimate beneficial use in the respective watersheds;

(c) The quantities of water, if any, available for export from the respective watersheds;

(d) The areas which can be served by the water available for export from each watershed; and

(e) The present use of water within each watershed together with the apparent claim of water right attaching thereto, excluding individual uses of water involving diversions of small quantities which, in the judgment of the Director of Water Resources, are insufficient in the aggregate to materially affect the quantitative determinations included in the report.

"Before adopting any findings which are reported to the Legislature, the department shall hold public hearings after reasonable notice, at which all interested persons may be heard."

(Added by Stats. 1956 (Ex. Sess.), Ch. 61; amended by Stats. 1959, Ch. 2025.)

For purposes of this investigation, the State has been divided into 12 major hydrographic areas. These areas, in turn, have been subdivided into hydrographic units generally comprising watersheds of individual rivers. These watersheds will be field surveyed in some detail and, where previous detailed studies have been made, the information will be brought up to date. Water resources and water requirements will be determined and reported in a bulletin for each of the hydrographic areas. Since many years are required to gather sufficient data for adequate analysis

of water resources and water requirements, surveys of present land and water use will be made, and the data published, separately for each of the hydrographic units. This procedure will make the land and water use data available sooner than would otherwise be possible. Bulletin No. 94-4, "Land and Water Use in Smith River Hydrographic Unit," is the fourth of a series reporting the results of these surveys.

At a future date, estimates, largely based on the land and water use surveys, will be made of quantities of water reasonably required for future beneficial use in each watershed. The quantity of water potentially available for export from each watershed will be determined after allowances are made for the satisfaction of the local requirements and prior rights to divert water to other areas. For those watersheds in which no exportable water is available, the water supply deficiency will be determined. These estimates will be published as they become available, in such form as to make possible a county-by-county determination.

The calculations of future water requirements will be based, in part, on predicted future land uses derived from land classification surveys, economic studies, population forecasts, industrial and agricultural development, and recreational needs. Agricultural water requirements will be based on unit water use by the various predicted crop types; urban and recreational requirements on per capita water use values; fish and wildlife requirements on minimum streamflow needed or water demands for wildlife area; and industrial water requirements on measured water deliveries to various types and sizes of industries now existing. In forecasting future industrial development, water quality problems will be given full consideration.

Water resources will be determined from records of all stream gaging stations, including new stations which were established for this and other investigations of the department. The new stations were generally constructed on streams which originate in the smaller watersheds for which runoff data are necessary, but for which no data have been available. Two new stream gaging stations requested for use by this investigation were added to the existing network of stations operated by the U. S. Geological Survey in the Smith River Hydrographic Unit. These stations were installed:

<u>Stream gaging station</u>	<u>Date installed</u>
Rowdy Creek at Smith River	June 20, 1957
Middle Fork Smith River at Gasquet	October 1, 1958

APPENDIX B

REFERENCES AND
REPORTS ON RELATED INVESTIGATIONS

APPENDIX B

REFERENCES AND REPORTS ON RELATED INVESTIGATIONS

Prior reports and documents reviewed in connection with the investigation of land and water use in the Smith River Hydrographic Unit include the following:

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APPENDIX C

LEGAL CONSIDERATIONS

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APPENDIX C

LEGAL CONSIDERATIONS

There are set forth in the following paragraphs brief general statements with respect to the California law of water rights to supplement and to provide a background for information on water rights contained in Chapter II. Also included is a tabulation of currently active applications to appropriate water within Smith River Hydrographic Unit filed with the State Water Rights Board.

California Water Rights

In California, water rights convey only the right to use water. Until absolute possession of water is acquired by some artificial means, no one owns water. However, the owner of water rights is entitled to enjoy them without interference by other users who have rights which are inferior to his.

Five kinds of water rights are recognized in California. These are riparian, overlying, appropriative, prescriptive, and pueblo. Riparian rights attach to surface water and water flowing in known and definite subterranean channels, while overlying rights attach only to underground water. Appropriative and prescriptive rights may be acquired in either surface or underground waters. Pueblo rights are now exercised in California only by the cities of Los Angeles and San Diego, each of which has a paramount right to satisfy its full needs from the stream system of waters flowing by the former Mexican pueblo from which each sprang.

All water rights, both to surface and to underground water, are subject to the doctrine of reasonable beneficial use expressed in Section 3 of Article 14 of the California Constitution, and Water Code Sections 100 and 101. This doctrine limits water rights to the quantity of water

reasonably required for beneficial use and prohibits waste, unreasonable use, and unreasonable methods of use or diversion.

Riparian Rights

A riparian right entitles the owner of lands which border or front on a watercourse to take water therefrom for use on such lands within the same watershed. However, the rights of the owner of riparian land are limited to the reasonable beneficial use of the natural flow of water which passes his land. Riparian rights pass with the title to the land, unless expressly reserved or excepted from the interests transferred, and are not gained by use or lost by mere nonuse. Although the land must be contiguous to the watercourse, the length of the frontage is not determinative of the rights; a large tract with a small frontage on a stream may be riparian to the stream. But the original grant determines the character of the land, and only the smallest contiguous tract held under a single title retains riparian rights.

A riparian owner has no right to any specified amount of the water of a stream as against other riparian owners. He has rights only to a reasonable share from the stream -- a correlative right which he shares mutually with other riparian owners. In the event of insufficient water for all, the available supply must be apportioned, except that an upper riparian owner may take the whole supply if necessary for domestic use. As against appropriators, the riparian owner has the paramount right to all the water of the stream which he can put to reasonable beneficial use, but that is the extent of his rights, and the appropriator can take the surplus.

Riparian rights do not authorize use of water on nonriparian land, nor do they permit the seasonal storage of water. Neither do they prevent temporary appropriation by others of water not presently needed for use on riparian land.

A parcel of land becomes nonriparian when severed from land bordering the stream, unless the riparian rights are reserved for the severed parcel by the grantor. Riparian rights may be destroyed when purportedly transferred apart from the land by grant, contract, or condemnation, and may be impaired or lost through prescription.

Overlying Rights

Owners of lands overlying a common underground water supply have the right to withdraw water for reasonable beneficial use on their overlying lands. Such overlying rights are analogous to riparian rights, in that both are based on ownership of land, and the rights of each overlying owner are mutual and correlative to the rights of all other owners. In the case of insufficient water to fully supply the requirements of all, the available supply must be equitably apportioned.

Overlying rights do not include use of water on nonoverlying land. However, surplus water not presently required for beneficial use on overlying land, and which may be withdrawn without creating an overdraft on the ground water supply, may be appropriated for use on nonoverlying land. But the overlying rights are paramount and all appropriative rights are subject to the future requirements of overlying land.

Appropriative Rights

An appropriation of water is any taking of water for other than riparian or overlying uses, whether such taking is from the underground by wells or from surface streams by direct diversion or storage. An appropriator, in the legal sense, is one who initially takes water without possessing rights which are based on the ownership of land. As between appropriators, the one first in time is first in right. A prior appropriator may take all the water

he needs up to the full amount to which he is entitled before a later appropriator may take any.

Normally, appropriative rights are inferior to riparian rights. An exception to this is the case of an appropriation of water diverted from streams flowing through vacant public lands before the riparian lands were withdrawn from the domain of the United States. The appropriative diversions or the lands they serve may be either upstream or downstream from the riparian lands. Any water not needed for the reasonable beneficial uses of those having prior rights may properly be appropriated.

No formal or statutory procedure is or ever has been prescribed or required in this state for those who take water by means of wells from underground percolating waters or underground basins. An appropriative right to take surplus water from such sources is acquired by extracting such water from the underground and applying it to beneficial uses.

Provided the development and application to use are completed with reasonable diligence, the priority of the right as against another appropriator related back to the first substantial act toward putting the water to use or to the date of application. Until 1872, water flowing in natural streams was appropriated by taking the water.

Sections 1410 through 1422 of the Civil Code, enacted in 1872, established a permissive procedure for perfecting an appropriation of **surface water**. Provision was made for posting a notice of appropriation at the proposed point of diversion and recording a copy with the county recorder. If the statutory procedure were followed and the appropriation completed with due diligence, priority related back to the date of posting; otherwise, priority was established only when the water was put to beneficial use.

Since the effective date of the water Commission Act of 1913, December 19, 1914, appropriation of surface water and water in subterranean

streams flowing in known and definite channels has been by compliance with required statutory procedure. An appropriation of such water now can be made in accordance with the provisions of Part 2, Division 2 of the Water Code (Water Code Sections 1200 to 1801). An application to appropriate unappropriated water must be filed with the State Water Rights Board. If the application is approved, a permit is issued authorizing the appropriation. When the appropriation has been completed, an inspection is made and a license is issued, to the extent of beneficial use, provided the terms and conditions of the permit have been fulfilled. The priority of a permit or license relates back to the date of the application.

A right to appropriate water may be lost either by abandonment or by continuous nonuse. To constitute abandonment, there must be concurrence of act and intent, wherein possession is relinquished with no intent to resume it for a beneficial use. Abandonment is, therefore, always voluntary and factual. In the case of an appropriation initiated prior to 1914, continuous nonuse for a period of five years results in the loss of appropriative water rights. In the case of appropriative rights acquired pursuant to the Water Commission Act or the Water Code, continuous nonuse for a period of only three years may result in loss of such rights.

Where ground water and surface water are interconnected, one acting as a tributary to the other, both are treated as part of a common supply and users of water from either source are entitled to protection from substantial injury as a result of use by others of water from the other source. Thus, an owner of land riparian to a stream may have his right to the use of water protected against impairment by an appropriator of percolating ground water tributary to the stream and required for the maintenance and support of its flow. Likewise, where water from a stream percolates to a ground water basin or stratum, the owner of land overlying the ground water supply may be protected

from an appropriation of water from the stream if this causes a substantial impairment of the ground water supply. As between riparian use of surface water and overlying use of ground water tributary to the stream, a sharing of the available water supply on the basis of reasonable beneficial use should be made.

Prescriptive Rights

It is possible to appropriate surface or ground water which is presently needed by others to satisfy riparian, overlying, or prior appropriative rights. Such appropriations may ripen into prescriptive rights where the use is actual, open and notorious, hostile and adverse to the original owners, continuous and uninterrupted for the statutory period of five years, made under claim of right, and with payment of taxes whenever such have been levied on the water rights. Absence of any of these essentials precludes the acquisition of prescriptive water rights.

Prescription of a right requires that, for a period of five years, the rightful owner either knows or should know of the adverse taking and fails to take any physical or legal steps to interrupt such taking. Irrespective of the needs or demands of the riparian, overlying, or prior appropriative user, an absolute right to only a fixed amount of water may be acquired by prescription. The quantity of such a right is determined by beneficial use. However, present use is the measure of the prescriptive right, and future needs cannot be included.

Riparian rights, overlying rights, appropriative rights, and prescriptive rights may be lost or diminished by prescription. While there is sufficient water flowing in a stream to supply the wants of all parties, the use of the water by anyone does not deprive the others of their water supply and, hence, is not an invasion of their rights. The same principle applies to a

downstream diversion of water as against the rights of an upstream riparian landowner or prior appropriator. At times when the safe yield of a ground water basin exceeds the needs of overlying landowners and appropriators, their prior rights are not invaded by a later appropriative taking of water from the underground supply. The later appropriation becomes adverse only when the ground water basin is overdrawn; that is, when the annual draft exceeds the safe annual yield. Although neither an overlying owner nor a prior appropriator may prevent a taking of surplus water, either the owner or the appropriator may institute legal proceedings to safeguard the supply once a surplus ceases to exist, and may enjoin any additional use beyond the point of safe yield. Since prescriptive rights can only be acquired to non-surplus water, these rights cannot ordinarily be acquired against the future needs of riparian or overlying owners.

The prior appropriator, lower riparian, or overlying owner may protect his rights for his present needs against an adverse appropriator by actually taking the needed water before the five-year period has run, or by the aid of the courts in the form of a declaratory judgment or injunction within the five-year period.

Determination of Water Rights

Under provisions of the Water Code, actions brought before either state or federal courts which involve determination of rights to the use of water may, at the court's discretion, be referred to the State Water Rights Board. Under provisions of Water Code Section 2000, the court may appoint the board to referee "any or all issues involved in the suit," or under Section 2001, it may limit the reference to "investigations of and report upon any or all physical facts involved." This reference procedure may be followed in suits involving either surface or ground waters, or both.

An alternative procedure for adjudication of rights to the use of water of streams, lakes, and other bodies of water, is available upon petition to the State Water Rights Board, but the method excludes the determination of rights to take water from an underground supply other than from a subterranean stream flowing through known and definite channels. Water Code Sections 2500 to 2900, inclusive, authorize the initiation of such proceedings.

Litigation Concerning Local Water Rights

There has been no major adjudication of water rights in the Smith River Hydrographic Unit. Consequently, neither the State Water Rights Board nor any of its predecessor agencies has been involved in a court reference, and state watermaster service has not been established.

Applications to Appropriate Water

Applications to appropriate water within the Smith River Hydrographic Unit, filed with the State since 1914 and active on June 28, 1960, are summarized in Table C-1. For each application relative to a diversion reported in Chapter II the diversion location is included in the table. The status of each application as to the granting of a permit or license is also shown in the table.

APPLICATIONS TO APPROPRIATE WATER IN SMITH RIVER HYDROGRAPHIC UNIT

(Filed with State Water Rights Board as of June 28, 1960)

Application number	Date filed	Present owner	DWR diversion location number	Source	Location of point of diversion					Amount	Period of diversion	Purpose	Status
					1/4	1/4	Sec.	Tp.	R.	S. & M.			
2459	7/21/21	Grassent City Municipal Water Department	16N/14W-2041	Tributary to Elk Creek	NW	SE	20	16N	14	H	Jan 1-Dec 31	Municipal	L-568
2594	10/17/21	Robert A. and Elizabeth C. Heston	--	Mitchell Creek	NE	NW	22	18N	14	H	Jan 1-Dec 31	Domestic and stockwatering	L-345
5176	7/30/26	Norman D. and Helen J. Hestad	--	Tributary to Pacific Ocean	NW	NE	35	16N	14	H	Jan 1-Dec 31 Jul 1-Sept 1	Domestic Irrigation, 2 acres	L-1479
5310	12/15/26	Fred W. and Helen Mascher	--	Kelly's Gulch	NW	SW	27	17N	2E	H	Jan 1-Dec 31	Domestic and power	L-1935
5705	9/30/27	Ortula Hoshuff, Helen Dell, Louis Wiegand, C. O. Young, Kenneth H. Pettis, Florence H. Pettis, and Merrill G. Dickson	--	Rock Creek	SW	NW	4	16N	1E	H	Jan 1-Dec 31	Domestic	L-3290
6126	11/20/28	Allen Place (Hupa)	19N/5E-3441	East Fork of East Fork Illinois River (now known as Dunn Creek)	SE	NW	34	19N	5E	H	Nov 1-Apr 1	Mining	L-3946
6147	12/29/28	California State Department of Public Works, Division of Highways	--	Tributary to Middle Fork Smith River	SE	SW	32	18N	4E	H	Jan 1-Dec 31	Domestic	L-1283
6184	2/7/29	Frank Slater, Clair Slater, Jack Slater, Ann Slater, Mary Slater, A. A. Sawyer, George Slater, Pauline Slater, Tracy Powell, Pauline Powell, Fred Dixon, Mr. and Mrs. Harry Koch, Ernest Adrington, Alvin Macchini, Dorothy Macchini, Orville Harrison, and Lertha Harrison	16N/1E-1641	Tributary to Smith River	Lot 1	16	16N	1E	1E	H	Jan 1-Dec 31	Domestic and irrigation, 1 acre	L-1135
6441	3/30/29	Calif. mil. State Department of Public Works, Division of Highways	--	Tributary to Smith River	NE	NE	29	17N	2E	H	Jan 1-Dec 31	Domestic	L-1288
6453	10/7/29	Patrick Creek Corporation	17N/3E-941	Patrick Creek	NE	SW	9	17N	3E	H	Jan 1-Dec 31	Power	L-1266
6593	12/2/29	San West Mutual Water Company	17N/2E-1951	Tributary to Smith River	SW	NE	19	17N	2E	H	Jan 1-Dec 31	Domestic	L-2040
6878	1/26/31	Fred A. and Helen A. Mascher	--	Kelly's Gulch	NW	SW	27	17N	2E	H	Jan 1-Dec 31	Domestic	L-1936
7242	4/19/42	United States Six Divers National Forest	--	Tributary to Middle Fork Smith River	SE	SW	32	18N	4E	H	Jan 1-Dec 31	Domestic	L-1507
7243	4/19/42	United States Six Divers National Forest	--	Tributary to Smith River	NE	NE	29	17N	2E	H	Jan 1-Dec 31	Domestic	L-1598
7512	3/1/33	Mina G. Miller and Charles A. Goughlan	17N/2E-2042	Springa tributary to Smith River	SE	SE	20	17N	2E	H	May 1-Oct 15	Irrigation, 2 acres	L-1734
7513	3/1/33	Mina G. Miller and Charles A. Goughlan	17N/2E-2042	Springa tributary to Smith River	SE	SE	20	17N	2E	H	Jan 1-Dec 31	Domestic	L-1953
7828	1/24/34	Bernard McClenon	--	Muslat Creek	NE	NE	29	15N	3E	H	Oct 1-Jun 1	Mining	L-1075
8165	11/19/34	United States Six Divers National Forest	--	Tributary to Elk Creek	SE	SE	3	18N	4E	H	May 1-Oct 31	Recreational, domestic, and fire protection	L-2180
8227	2/2/35	United States Six Divers National Forest	--	Tributary to Middle Fork Smith River	SE	SW	9	17N	3E	H	Jan 1-Dec 31	Domestic	L-2181
8252	2/23/35	Lawrence E. and Bertha Cadra	--	Rock Creek	SW	NW	4	16N	1E	H	Jan 1-Dec 31	Domestic	L-2098

• P - Indicates permit number of application approved. L - Indicates license number of right confirmed. Incomplete - Indicates application not yet complete. Pending - Indicates application complete but not yet approved.

TABLE C-1 (Continued)
APPLICATIONS TO APPROPRIATE WATER IN
SMITH RIVER HYDROGRAPHIC UNIT
(Filed with State Water Rights Board as of June 28, 1960)

Application number	Date filed	Present owner	DWR diversion location number	Source	Location of point of diversion						Amount	Period of diversion	Purpose	Status ^a
					1/4	1/4	Sec.	Tp	R.	S. B. M.				
8409	8/3/35	Francis M. Stump	—	Rock Creek	SW	NW	4	16N	1E	H	3,300 gpd	Jan 1-Dec 31	Domestic	L-2735
8448	9/18/35	Francis M. Stump	—	Rock Creek	SW	NW	4	16N	1E	H	0.46 cfs	Jan 1-Dec 31	Power	L-2025
8520	12/11/35	California State Department of Public Works, Division of Highways	—	Tributary to Smith River	SE	SE	18	17N	3E	H	2,500 gpd	Jan 1-Dec 31	Recreational	L-2189
8776	9/21/36	Merrill G. Dickson	—	Rock Creek	SW	NW	4	16N	1E	H	6,500 gpd	Jan 1-Dec 31	Domestic and irrigation, 0.75 acres	L-7774
8773	1/9/37	Robert K. and Elizabeth C. Hastings and Robert H. and Bernice C. Stachurski	18N/14-21B1	Mitchell Creek	SE	SE	21	18N	1W	H	0.35 cfs	Apr 1-Oct 1	Irrigation, 88 acres	L-2793
9469	12/12/38	United States Six Rivers National Forest	—	Tributary to Middle Fork Smith River	Lot 6	Lot 6	19	17N	3E	H	1,700 gpd	Jan 1-Dec 31	Domestic and recreational	L-2490
9470	12/12/38	United States Six Rivers National Forest	—	Tributary to Middle Fork Smith River	Lot 5	Lot 5	19	17N	3E	H	1,350 gpd	Apr 15-Dec 1	Domestic and recreational	L-2491
9471	12/12/39	United States Six Rivers National Forest	—	Springs tributary to Middle Fork Smith River	NW	SW	21	17N	2E	H	2,500 gpd	Jan 1-Dec 31	Domestic and recreational	L-2492
9475	12/16/38	United States Six Rivers National Forest	—	Tributary to Hurdy Rudy Creek	NE	SE	14	15N	2E	H	1,500 gpd	Apr 15-Nov 15	Domestic	L-2493
9480	1/26/40	United States Six Rivers National Forest	—	Tributary to Middle Fork Smith River	NW	SW	6	17N	4E	H	1,000 gpd	Jan 1-Dec 31	Domestic	L-2708
9482	1/26/40	United States Six Rivers National Forest	—	Springs tributary to Middle Fork Smith River	SE	SE	13	17N	2E	H	500 gpd	May 1-Nov 1	Domestic and recreational	L-2709
9814	1/26/40	United States Six Rivers National Forest	—	Springs tributary to North Fork Smith River	NE	NW	20	17N	2E	H	2,300 gpd	Jan 1-Dec 31	Domestic	L-5320
9945	7/2/40	United States Six Rivers National Forest	—	Springs tributary to North Fork Smith River	NW	NW	21	17N	2E	H	2,000 gpd	Jan 1-Dec 31	Domestic and recreational	L-7795
10279	6/22/41	United States Six Rivers National Forest	—	Springs tributary to Middle Fork Smith River	SE	SE	9	17N	3E	H	300 gpd	May 1-Nov 1	Domestic	L-2441
10666	6/28/43	A. J. and Florence S. Archibald, James R. and Lavine H. Jordan, Charles E. and Geraldine E. and Charles E. and Helen E. Holiday	—	Springs tributary to Pacific Ocean	NE	NW	7	14N	1E	H	2,500 gpd	Jan 1-Dec 31	Domestic	L-5369
10948	2/5/45	United States Six Rivers National Forest	—	Springs tributary to Middle Fork Smith River	SW	NW	32	14N	4E	H	900 gpd	Jan 1-Dec 31	Domestic	L-3092
10969	2/5/45	United States Six Rivers National Forest	—	Springs tributary to Middle Fork Smith River	NE	NW	35	17N	1E	H	400 gpd	Jan 1-Dec 31	Domestic	L-3942
11041	5/7/45	Clara G. Stropan	18N/14-27D1	Dallan Creek	NW	NW	27	18N	3W	H	1.06 cfs	May 1-Oct 31	Irrigation, 100 acres	L-3059
11107	7/17/45	Burton and Pearl Tyler	—	Tributary to Pacific Ocean	NE	SW	32	19N	1W	H	16,000 gpd	Jan 1-Dec 31	Domestic	L-3213
11378	4/18/46	Arthur D. and Emma H. McBridge	—	Tributary to Middle Fork Smith River	SW	NE	28	17N	2E	H	0.12 cfs	Jan 1-Dec 31	Domestic and irrigation, 4 acres	P-6640
11395	4/7/46	Robert K. and Elizabeth C. Hastings	18N/14-21B1	Mitchell Creek	SE	SE	21	18N	1W	H	0.26 cfs	Apr 1-Oct 15	Irrigation, 88 acres	L-3491

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Application number	Date filed	Present owner	DWR diversion to cotton number	Source	Location of point of diversion					Amount	Period of diversion	Purpose	Status	
					1/4	1/4	Sec	Tp	R.					S. E. M.
11525	8/22/46	Hollis J. and Jean Nunneley	17N/3E-3R1	Monkey Creek	SE	SE	3	17N	3E	H	2.25 cfs	Jan 1-Dec 31	Fish Culture	L-3384
11595	10/25/46	Del Norte Palomares Mutual Water Company	--	Tributary to Pacific Ocean	NE	NW	7	14N	1E	N	2,400 gpd	Jan 1-Dec 31	Domestic and stockwatering	L-5927
11801	9/28/49	George H. Wiman	--	Hazelton Creek	NW	NE	27	17N	1W	N	12,000 gpd	May 1-Sept 30	Irrigation, 2 acres	L-3400
11975	7/7/47	Ethel L. Penney Burke	--	Tributary to Smith River	SW	SW	10	16W	1E	N	1,700 gpd	Jan 1-Dec 31	Domestic and fire protection	L-3396
12221	12/31/47	Arthur and Florence Nanseth	--	Tributary to Smith River	NW	SE	9	16W	1E	H	4,500 gpd	Jan 1-Dec 31	Domestic	L-3866
12222	12/31/47	Frank C. and Mildred V. Curtis	--	Tributary to Smith River	NW	SE	9	16N	1E	H	4,100 gpd	Jan 1-Dec 31 May 1-Oct 1	Domestic Irrigation, 1.5 acres	L-5141
12223	12/31/47	Edgar W. and Mildred Johnson	--	Tributary to Smith River	NW	SE	9	16N	1E	N	3,100 gpd	Jan 1-Dec 31 May 1-Oct 1	Domestic Irrigation, 1.5 acres	L-4657
12224	12/31/47	Robert E. and Martha A. Niatt	--	Tributary to Smith River	NW	SE	9	16N	1E	H	1,100 gpd	Jan 1-Dec 31	Domestic	L-3867
12225	12/31/47	Wes A. and Leona H. Shlager	--	Tributary to Smith River	NW	SE	9	16W	1E	N	2,000 gpd	Jan 1-Dec 31	Domestic	L-5214
12575	6/30/48	Charles C. and Blanche L. Sallig	--	Spring tributary to Smith River	SW	SW	10	16W	1E	H	16,000 gpd	Jan 1-Dec 31 Jan 1-Oct 1	Domestic and fire protection Irrigation, 3 acres	L-3775
12614	7/28/48	M. J. Dickson, et al.	--	Spring tributary to Rock Creek	NW	SW	4	16N	1E	N	2,000 gpd	Jan 1-Dec 31	Domestic	L-4302
12620	7/26/48	Merrill G. Dickson	--	Spring tributary to Rock Creek	NW	SW	4	16N	1E	H	2,000 gpd	Jan 1-Dec 31	Domestic	L-3498
12796	9/23/48	F. L. Flatsted	--	Spring tributary to Pacific Ocean	NW	NE	7	14W	1E	H	1,300 gpd	Jan 1-Dec 31	Domestic	L-5929
12776	11/3/48	William D. and Mary J. Fisher	18N/14-SN1	Gilbert Creek	SE	NE	5	18N	1W	N	0.08 cfs	May 1-Oct 1	Irrigation, 35 acres	L-5025
12845	2/23/49	Elmer E. and Pearl A. Johnston	17N/4E-SF1	Tributary to Middle Fork Smith River	NW	NE	5	17N	4E	N	2.5 cfs	Oct 1-Jul 31	Power	L-3610
13295	8/15/49	Lester A., Martha S., and Lewis Ulrich	17N/14-211	Smith River	NE	SW	2	17N	1W	N	0.48 cfs	May 15-Oct 1	Irrigation, 76 acres	L-4048
13366	4/28/49	Richard J. and Harjorie E. Spelcher	--	Spring tributary to Smith River	SW	SW	10	16N	1E	N	16,000 gpd	Jan 1-Dec 31	Domestic and fire protection	L-4052
13368	9/28/49	David Zopfi	--	Zopfi Spring	SE	NE	8	16W	1E	N	5,700 gpd	Jan 1-Dec 31	Domestic	L-3816
13373	10/3/49	Presley D. and Cella W. Tryon	--	Scott Creek	SE	SE	24	17N	1W	N	16,000 gpd	Jan 1-Dec 31	Domestic and irrigation, 2 acres	P-7902
13382	10/5/49	Clarence A. and Mabel L. Sawyer	--	Springs tributary to Smith River	SW	NW	9	16W	1E	N	4,320 gpd	May 1-Oct 1	Domestic and irrigation, 1 acre	L-4560
13464	11/14/49	Verne C. and Elsie H. Nielsen	--	Tributary to Middle Fork Smith River	NE	NW	28	17N	2E	N	9,250 gpd	Jan 1-Dec 31	Domestic	L-3729
13648	3/23/50	Evergreen Glade Courts	--	Zopfi Spring	SE	NE	8	16W	1E	N	1,500 gpd	Jan 1-Dec 31	Domestic	L-4963
13713	5/1/50	Olga V. Lesley	--	Reynolds Creek	SW	SW	4	16W	1E	N	6,500 gpd	Jan 1-Dec 31	Domestic	L-4139
13775	6/7/50	Ray W. and Mable H. Struening	18N/14-SN1	Gilbert Creek	SW	NE	5	18W	1W	N	0.11 cfs	Apr 1-Oct 1	Irrigation, 67 acres	L-4128

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TABLE C-1 (Continued)
APPLICATIONS TO APPROPRIATE WATER IN
SMITH RIVER HYDROGRAPHIC UNIT
(Filed with State Water Rights Board as of June 28, 1960)

Application number	Date filed	Present owner	DWR diversion location number	Source	Location of point of diversion						Amount	Period of diversion	Purpose	Status
					1/4	1/4	Sec.	Tp.	R.	B. & M.				
11996	1/13/46	Crescent City Municipal water Department	16N/14-21C1	Tributary to Elk Creek	NE	N4	21	16N	14	H	0.557 cfs	Jan 1-Dec 31	Municipal, industrial, domestic, and recreational	P-8332
11998	11/30/50	Cal-Tree Veneer, Inc.	16N/14-21C1	Tributary to Lake Earl	SE	S4	9	16N	14	H	0.01 cfs 35 af	Jan 1-Dec 31 Nov 1-Mar 1	Industrial	L-4140
11999	4/5/51	Way W. and Hable H. Strumling	--	Tributary to Pacific Ocean	NE	SE	5	18N	14	H	1,000 gpd	Apr 1-Oct 1	Industrial	L-4129
11999	8/3/51	Joseph A. and Anna G. Smith	--	Tributary to Smith River	SE	S4	20	17N	2E	H	1,000 gpd	Jan 1-Dec 31	Domestic and fire protection	L-4176
11999	5/3/51	Joseph A. and Anna G. Smith	--	Tributary to Smith River	SE	S4	20	17N	2E	H	1,000 gpd	Jan 1-Dec 31	Domestic and fire protection	L-4379
11999	6/25/51	1st Norte County Girl Scout Committee	--	Tributary to Middle Fork Smith River	NE	NE	28	17N	2E	H	2,500 gpd	Jan 1-Dec 31	Domestic	P-8398
11999	7/16/51	United States Six Rivers National Forest	--	Spring tributary to Patrick Creek	SE	S4	9	17N	3E	H	1,900 gpd	Jan 1-Dec 31	Domestic	L-4381
11999	9/14/51	James C. Dalton, Way H. Miller, and Clifford L. Wilson	--	Spring tributary to Smith River	NW	S4	4	16N	1E	H	4,500 gpd	Jan 1-Dec 31	Domestic	L-5129
11999	12/19/51	A. H. Moore	16N/2E-521	Tributary to North Fork Smith River	NW	SE	5	18N	2E	H	0.15 cfs	Jan 1-Dec 1 Jun 1-Oct 31	Domestic and stockwatering Irrigation, 11 acres	L-4527
11999	12/21/51	McFord Veneer and Plywood Corporation	16N/14-12C1	Jordan Creek	S4	NE	14	16N	14	H	0.25 cfs 84 af	Jun 1-Dec 1 Dec 1-Jun 1	Industrial	L-4504
11999	3/5/52	Harold L. and Alice Bales	--	Spring tributary to Smith River	NE	N4	9	16N	1E	H	500 gpd	Jan 1-Dec 31	Domestic	L-5169
11999	4/14/52	Robert H. Moore	16N/2E-521	Tributary to North Fork Smith River	NW	SE	5	18N	2E	H	0.45 cfs	Jan 1-Dec 31	Power	L-4528
11999	5/23/52	Otis R. Wright	--	Tributary to Pacific Ocean	NW	S4	26	16N	14	H	0.25 cfs	Jan 1-Dec 31	Domestic, stockwatering, fire protection, and irrigation, 5 acres	P-9379
11999	5/28/52	F. L. and Edna H. Flaister	--	Tributary to Smith River	NE	SE	3	16N	1E	H	0.01 cfs	May 15-Oct 31	Irrigation, 2.5 acres	L-5026
11999	6/27/52	Harold G. Lucy	--	Spring tributary to Little Mill Creek	NW	SE	9	16N	1E	H	500 gpd	Jan 1-Dec 31	Domestic	L-5411
11999	7/28/52	H. H. and Adeline Adsit and E. H. Mallett	--	Smith River	NE	SE	8	16N	1E	H	2,400 gpd	Jun 1-Oct 31	Domestic	L-5125
11998	8/1/52	Margaret Harefield and Eleanor Huffman	17N/14-12C1	Smith River	NW	S4	12	17N	14	H	0.58 cfs	May 15-Oct 1	Irrigation, 118 acres	L-4720
15990	8/28/52	Leslie Baerlein, Inc.	16N/14-28B1	Elk Creek	NW	NE	28	16N	14	H	0.48 cfs 75 af	May 15-Oct 31 Apr 1-Nov 1	Industrial and fire protection	L-4512
15199	2/4/53	C. F. and Marie Huffman	15N/1E-7C1	Mill Creek	SW	NE	7	15N	1E	H	0.09 cfs	Jun 1-Oct 1	Irrigation, 27 acres	L-5134
15191	2/9/53	C. F. and Marie Huffman	15N/1E-7C1	Mill Creek	NW	NE	7	15N	1E	H	0.10 cfs	Jun 1-Oct 1	Irrigation, 30 acres	L-5133
15192	2/9/53	C. F. and Marie Huffman	15N/1E-691	Mill Creek	SE	S4	6	15N	1E	H	0.04 cfs	Jun 1-Oct 1	Irrigation, 10 acres	L-5147
15193	2/9/53	C. F. and Marie Huffman	15N/1E-691	Mill Creek	NW	NE	6	15N	1E	H	0.06 cfs	Jun 1-Oct 1	Irrigation, 18 acres	L-5148
15264	3/31/53	Northern California Plywood, Inc.	16N/14-18C1	Dead Lake	NE	NW	18	16N	14	H	11.14 cfs	Jan 1-Dec 31	Industrial and fire protection	L-5440
15286	4/9/53	Northern California Plywood, Inc.	--	Stump Lake	NW	N4	1E	16N	14	H	1,300 gpd	Jan 1-Dec 31	Domestic	L-5361

* P - Irrigation permit number of application approved. L - Indicates license number of right confirmed. Incomplete - Indicates application not yet complete. Pending - Indicates application complete but not yet approved.

**APPLICATIONS TO APPROPRIATE WATER IN
SMITH RIVER HYDROGRAPHIC UNIT**

(Filed with State Water Rights Board as of June 28, 1960)

Application number	Date filed	Present owner	DWR diversion location number	Source	Location of point of diversion					Amount	Period of diversion	Purpose	Status
					1/4	1/4	Sec	Tp	R	B & M			
15295	4/15/53	United States Six Rivers National Forest	--	Spring tributary to North Fork Smith River	NW	NE	20	17N	2E	N	Jan 1-Dec 31	Domestic	L-5318
15296	4/15/53	United States Six Rivers National Forest	--	Spring tributary to North Fork Smith River	SE	SE	17	17N	2E	N	Jan 1-Dec 31	Domestic	L-5321
15297	4/15/53	United States Six Rivers National Forest	--	Spring tributary to North Fork Smith River	NE	NE	20	17N	2E	H	Jan 1-Dec 31	Domestic	L-5319
15334	5/8/53	Ed Carlson	17N/3E-901	Spring tributary to Patrick Creek	SW	NW	9	17N	3E	N	Jan 1-Dec 31	Power and domestic	L-4982
15473	8/24/53	Lund Plywood and Manufacturing Company	16N/14W-2182	Spring tributary to Patrick Creek	NE	SE	8	17N	3E	N	Nov 1-Mar 1	Industrial	L-5565
15650	12/15/53	James S. and Harriet M. Hight	--	Tributary to Elk Creek	SW	NW	21	16N	1W	H	Jan 1-Dec 31	Domestic and stockwatering	L-5153
16538	8/22/55	Joseph A. and Anna G. Smith	--	Tributary to Sandy Creek	SE	SE	23	18N	1W	H	Jan 1-Oct 1	Irrigation, 7 acres	P-10563
16701	10/27/55	Wilson and May L. Freeman	15N/2E-1311	Tributary to Smith River	SE	SW	20	17N	2E	N	Jan 1-Dec 31	Domestic and fire protection	P-10504
16846	1/23/56	Ted H. and Roberta H. Fagan	--	James Creek	SW	SE	13	15N	2E	H	May 1-Oct 15	Irrigation, 84 acres	P-10645
16851	1/25/56	David F. and Neva P. Spindler	--	Spring tributary to Middle Fork Smith River	SE	SE	20	17N	2E	H	Jan 1-Dec 31	Domestic	P-10646
16949	3/20/56	Edward V. and Gladys M. Pettis	--	Spring tributary to Middle Fork Smith River	SE	SE	20	17N	2E	N	Jan 1-Dec 31	Domestic	P-10688
17051	4/24/56	California Water Commission	--	Smith River	NW	NE	24	17N	1W	H	Jan 1-Dec 31	Domestic, fish culture, and irrigation, 4 acres	Incomplete
17052	4/24/56	California Water Commission	--	South Fork Smith River	-	NW	10	15N	2E	H	Jan 1-Dec 31	Irrigation, domestic, municipal, industrial, flood control, fish and wildlife, recreational, and salinity control	Incomplete
17068	5/3/56	Noel and Margaret LaCombe	--	South Fork Smith River	-	NW	10	15N	2E	H	Jan 1-Dec 31	Power	P-10848
17275	9/13/56	Eddie and Ruby M. Dorrah	--	Smith River	SE	SW	9	16N	1E	H	Jan 1-Dec 31	Domestic and irrigation, 6 acres	L-5874
17429	1/22/57	Ellen M. Yoder, C. F. Corriell, W. J. Pullan, and Albur Earl	--	Spring tributary to Smith River	NW	SE	9	16N	1E	H	Jan 1-Dec 31	Domestic	P-10946
17811	9/3/57	Short and English	16N/14W-312	Jordan Creek	SE	NW	3	16N	1W	H	Jan 1-Dec 31	Domestic	P-11427
17921	12/3/57	County of Del Norte	--	Spring and stream tributary to Smith River	SE	SW	2	17N	3E	H	Jun 1-Oct 1	Irrigation, 56 acres	P-11622
17930	12/31/57	United States Six Rivers National Forest	--	Spring tributary to Smith River	SE	SW	2	17N	3E	H	Jan 1-Dec 31	Domestic and irrigation, 10 acres	P-11418
17956	1/23/58	City of Crescent City	17N/14W-1381	Tributary to Middle Fork Smith River	NW	NE	27	17N	2E	H	Jan 1-Dec 31	Domestic	P-11475
18417	11/20/58	A. W. Freeman	--	Smith River	NW	NE	13	17N	1W	N	Jan 1-Dec 31	Municipal	P-11874
18608	3/25/59	Carl A. Mating	18N/14W-301	Spring tributary to Smith River	NE	NE	25	17N	1W	N	Jan 1-Dec 31	Domestic	P-12017
18646	4/15/59	James E. Jewssick	--	Elk Creek	NE	NW	2	18N	4E	H	May 15-Sept 30	Recreational and fish culture	P-12112
				Full Creek	NE	SE	23	8N	1W	H	Jan 1-Dec 31	Domestic, recreational, and fish culture	

P - Indicates present number of application approved. L - Indicates license number of right confirmed. Incomplete - Indicates application not yet complete. Pending - Indicates application complete but not yet approved.

TABLE C-1 (Continued)
APPLICATIONS TO APPROPRIATE WATER IN
SMITH RIVER HYDROGRAPHIC UNIT
(Filed with State Water Rights Board as of June 28, 1960)

Application number	Date filed	Present owner	DWR diversion location number	Source	Location of point of diversion							Amount	Period of diversion	Purpose	Status	
					1/4	1/4	Sec	Tp	R	B	θ					M
18651	4/17/59	Ray Parker and Nell Parker	—	Tributary to Pacific Ocean	SE	NE	8	18N	1W		H		0.025 cfs	Jun 1-Nov 1	Domestic and Irrigation, 1.75 acres	P-12030
18676	4/24/59	Wilson Freeman	—	Tributary to South Fork of Smith River	SW	SE	24	15N	2E		H		1.5 cfs	Jan 1-Dec 31	Irrigation, 120 acres	P-12081
18756	9/1/59	C. H. and B. McClendon	—	Deer Creek	SE	NW	32	16N	2E		H		0.13 cfs	Jan 1-Dec 31	Irrigation, 73 acres	P-12218
				Boulder Creek	NW	SE	5	15N	2E		H		0.10 cfs			
19171	1/7/60	Ray H. Strubling and Noble H. Strubling	—	Gilbert Creek	SW	NE	5	18N	1W		H		1 cfs	Apr 1-Nov 1	Irrigation, 83.33 acres	Pending
19174	1/11/60	William J. Buckner and Isabel H. Buckner	—	Fritchett Creek	NE	SW	35	16N	1W		H		500 gpd	May 1-Sept 15	Domestic and Irrigation, 2 acres	Pending
19175	1/11/60	William J. Buckner and Isabel H. Buckner	—	Buckner Creek	NW	SE	35	16N	1W		H		500 gpd	Jan 1-Dec 31	Domestic, stockwatering, and Irrigation, 3 acres	Pending
19321	3/24/60	Lehman Properties, Inc.	—	Two tributaries to Middle Fork Smith River	SE	SE	19	17N	2E		H		0.22 cfs	Apr 1-Sept 30	Irrigation, 35 acres	Incomplete
					SW	SE	19	17N	2E		H					
19322	3/24/60	Lehman Properties, Inc.	—	Tributary to Middle Fork Smith River	SW	NE	30	17N	2E		H		0.04 cfs	Jan 1-Dec 31	Domestic, stockwatering, and Irrigation, 3 acres	Pending

APPENDIX D

DETAILED DESCRIPTIONS OF
CERTAIN SURFACE WATER DIVERSIONS

TABLE OF CONTENTS

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Charles R. Coughlan and Nina G. Weller	D-3
Upper Field Gulch Ditch	D-4

APPENDIX D

DETAILED DESCRIPTIONS OF CERTAIN SURFACE WATER DIVERSIONS

This appendix presents additional data on certain surface water diversions which could not adequately be presented in Table 5 of the report.

Charles R. Coughlan and Nina G. Weller (Diversion 17N/2E-20R1; Middle Fork Subunit).

This diversion is from unnamed springs located about one-fourth mile south of the confluence of the North and Middle Forks of Smith River and was begun about 1852 by Horace Gasquet, who used it continuously until his death in 1896. In that year, Fred Frantz and J. B. Endert purchased the property and on May 25, 1896, they filed an application to appropriate water from springs tributary to Smith River. This filing is recorded in Book C of Locations at page 325, Del Norte County Records.

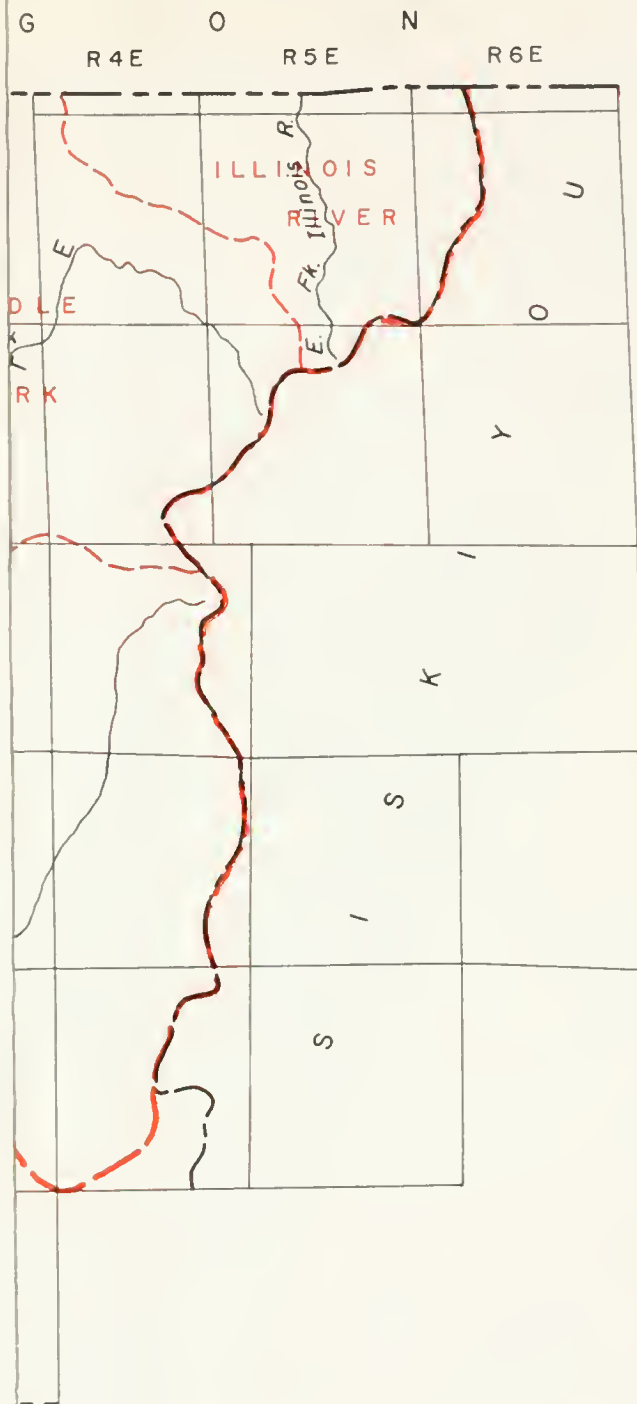
The owners of this diversion up to 1933, in order, were: (1) Horace Gasquet, (2) Fred Frantz and J. B. Endert, (3) Ralph W. Lake, (4) J. P. Bowman, (5) J. J. and Eleanor McNamara, (6) Roy and J. Leo Ward, and (7) A. D. and Kathryn Rutherford.

The Rutherfords were aware of the 1896 filing but were uncertain as to the validity of the water right. Consequently, on March 1, 1933, they filed an application with the Division of Water Resources, predecessor to the State Water Rights Board, to appropriate water by this same diversion (Application No. 7513). Subsequently, License Number 1958 was issued to them to divert 0.03 cubic feet per second for domestic use. Owners of the diversion system and water rights since the Rutherfords are Harlan Wilson, Louis K. Shostak, Mr. and Mrs. Gordon R. Weller, and Nina G. Weller and Charles R. Coughlan.

Upper Field Gulch Ditch (Diversion 17N/2E-20R2; Middle Fork Subunit).

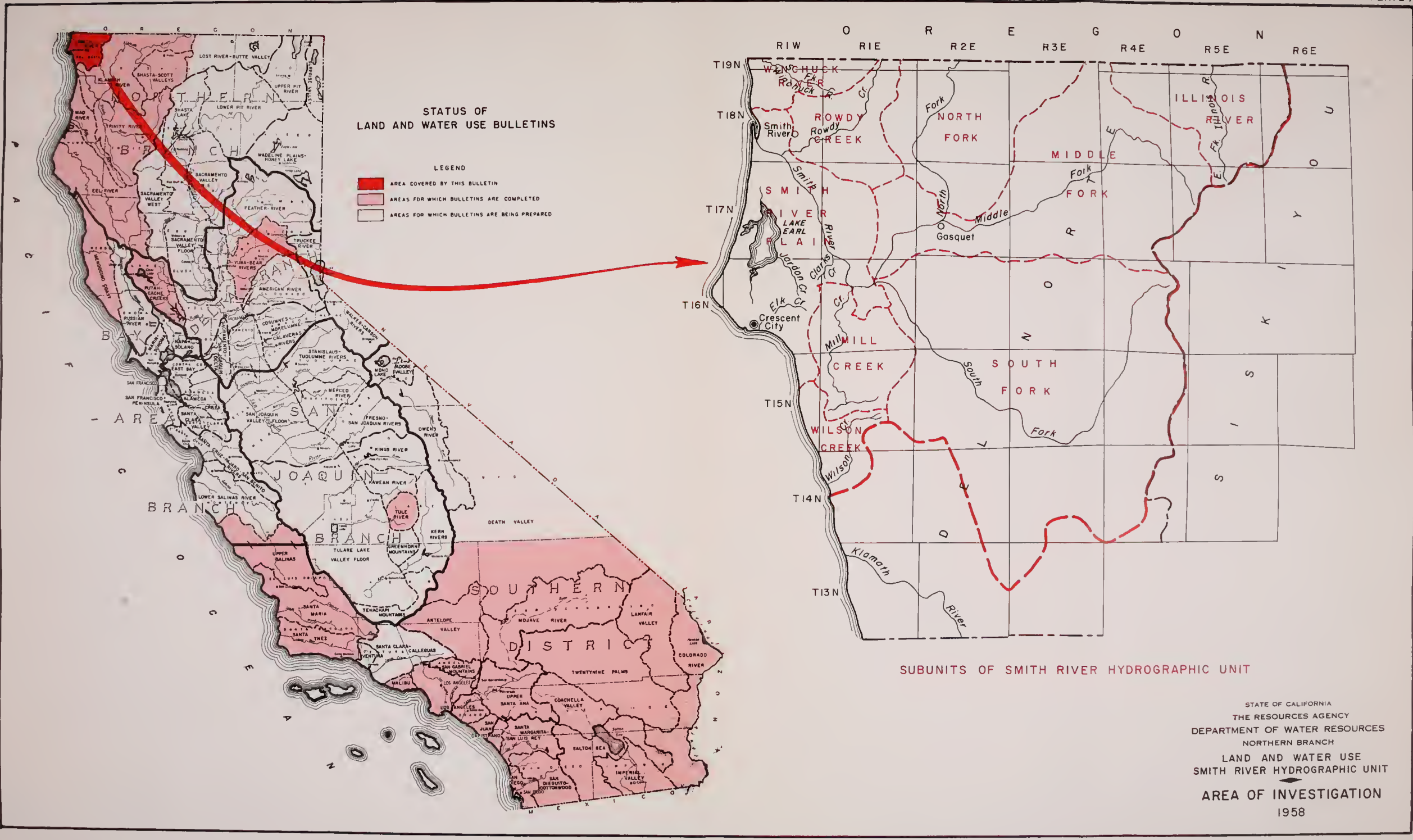
This diversion is from unnamed springs located about three-tenths mile southeasterly from the confluence of the Middle and North Forks of Smith River. It was begun about 1852 by Horace Gasquet, and has been used continuously ever since. After the death of Mr. Gasquet in 1896, the diversion and its area of use were purchased by Fred Frantz and J. B. Endert. On May 29, 1896, these owners filed an application to appropriate "all the water of a tributary of Smith River" for this diversion. The filing is recorded in Book C of Locations at page 323, Del Norte County Records.

Other owners of the diversion in order following those named above were Ralph W. Lake, J. P. Bowman, J. J. and Eleanor McNamara, and C. Roy and J. Leo Ward. Throughout this period, ownership of the diversion remained undivided, but the Wards deeded it in three parts to separate parties. A one-third interest in the ditch, together with part of the area of use, was deeded to B. C. Endert, and another third to Joe Woods. At a later date the Wards deeded the remaining one-third interest to A. D. and Kathryn Rutherford. The Rutherfords were aware of the 1896 appropriation, but were uncertain as to the validity of the water right due to the property having been subdivided. Consequently, they filed an application with the Division of Water Resources, predecessor of the State Water Rights Board, on March 1, 1933, (Application No. 7512). Subsequently, they were granted License Number 1734 for the diversion of 0.025 cubic feet per second for the irrigation of two acres. This water right has been assigned in order to Harlan Wilson, Louis K. Shostak, Mr. and Mrs. Gordon R. Weller, and Nina G. Weller and Charles R. Coughlan. Besides acquiring this water right and the interest in the diversion held by the Rutherfords, the Wellers also bought the one-third interest in the diversion owned by Joe Woods. The combined two-thirds interest in the diversion and the 1933 appropriative water right were assigned to the present owners in 1958. B. C. Endert has retained his one-third interest in the diversion to the present



SMITH RIVER HYDROGRAPHIC UNIT

STATE OF CALIFORNIA
 THE RESOURCES AGENCY
 DEPARTMENT OF WATER RESOURCES
 NORTHERN BRANCH
 LAND AND WATER USE
 SMITH RIVER HYDROGRAPHIC UNIT
 AREA OF INVESTIGATION
 1958





- LEGEND
- LANDS RECEIVING FULL IRRIGATION
 - LANDS USUALLY IRRIGATED BUT RILE OF FALLOW IN 1958
 - NATURALLY IRRIGATED MESQUITE LANDS
 - DRY-FARMED LANDS
 - URBAN LANDS
 - RECREATIONAL LANDS
 - LANDS IRRIGATED WITH GROUND WATER
 - LANDS IRRIGATED WITH BOTH GROUND AND SURFACE WATER
 - WASH LANDS

- GRAVITY DIVERSION
- PUMP DIVERSION
- DIVERSION CANAL OR DITCH
- DIVERSION PIPE
- STREAM GAGING STATION
- HYDROGRAPHIC UNIT BOUNDARY
- HYDROGRAPHIC SUBUNIT BOUNDARY

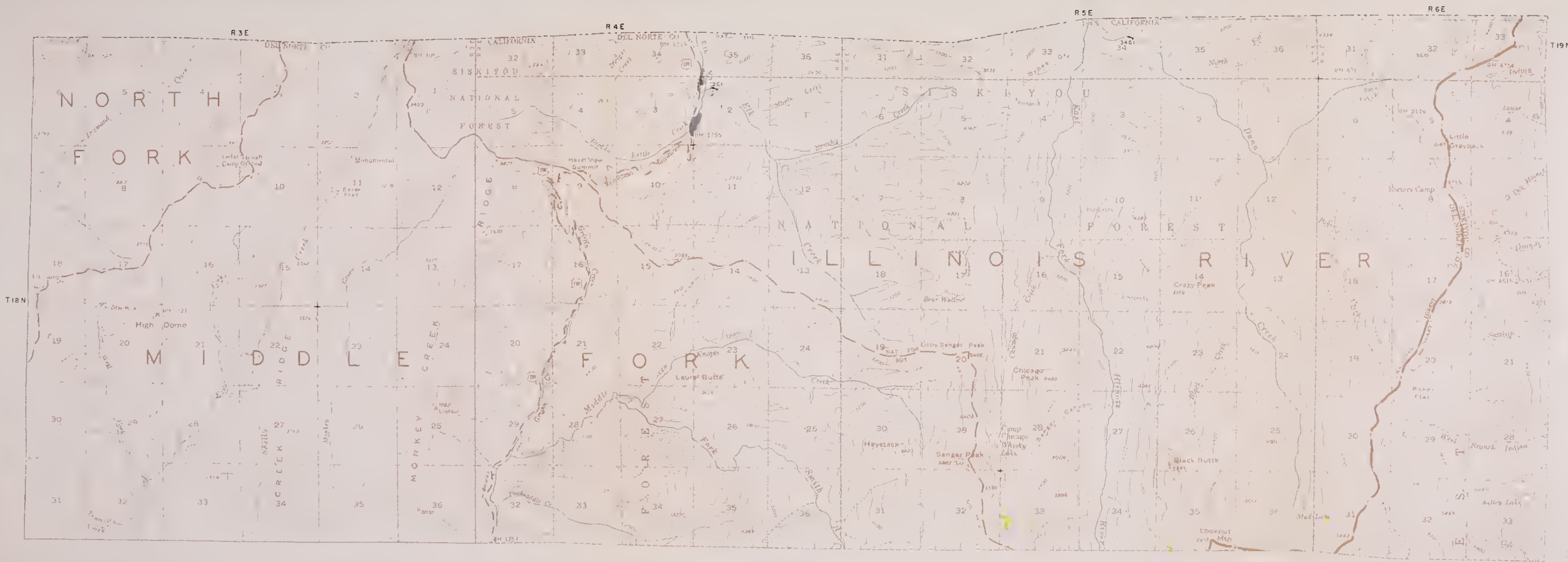
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STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
NORTHERN BRANCH
LAND AND WATER USE
SMITH RIVER HYDROGRAPHIC UNIT
LAND AND WATER USE
T18-19N, R1W-2E H68M
1958

DIVERSIONS SHOWN ARE NUMBERED BY
TOWNSHIP RANGE AND SUBDIVISION OF
SECTION, BY DIVERSION NUMBER

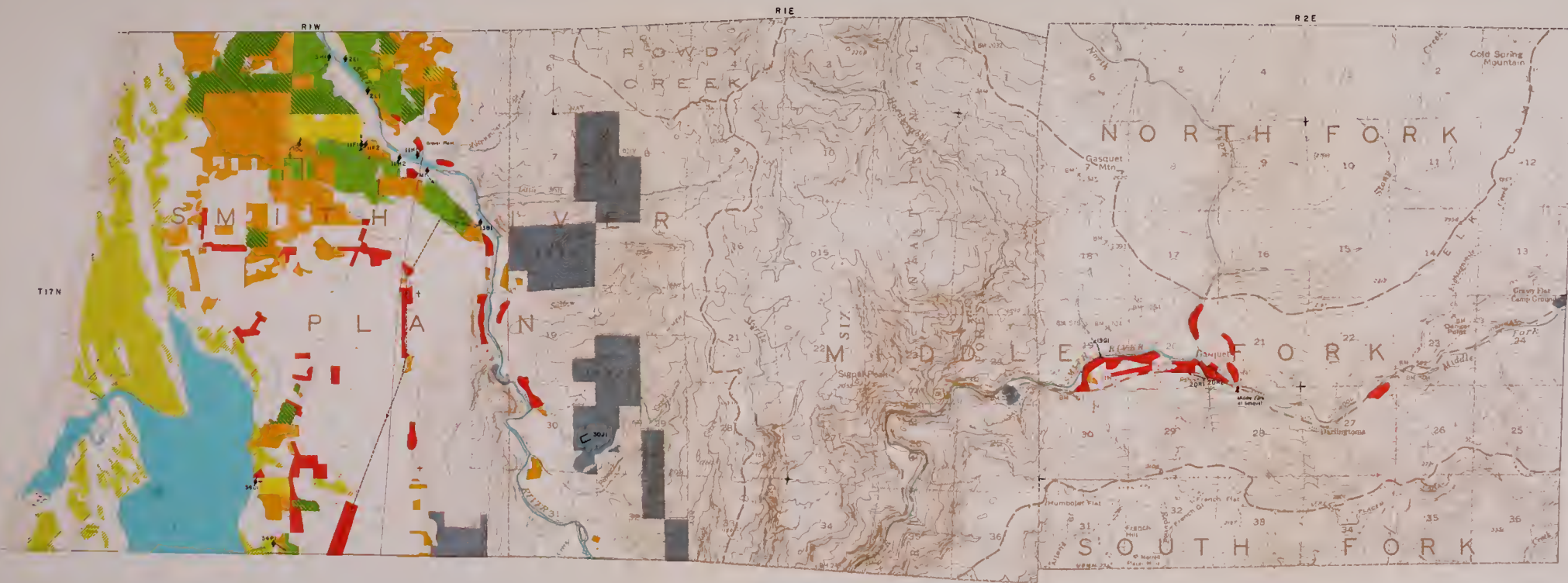
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INDEX TO SHEETS

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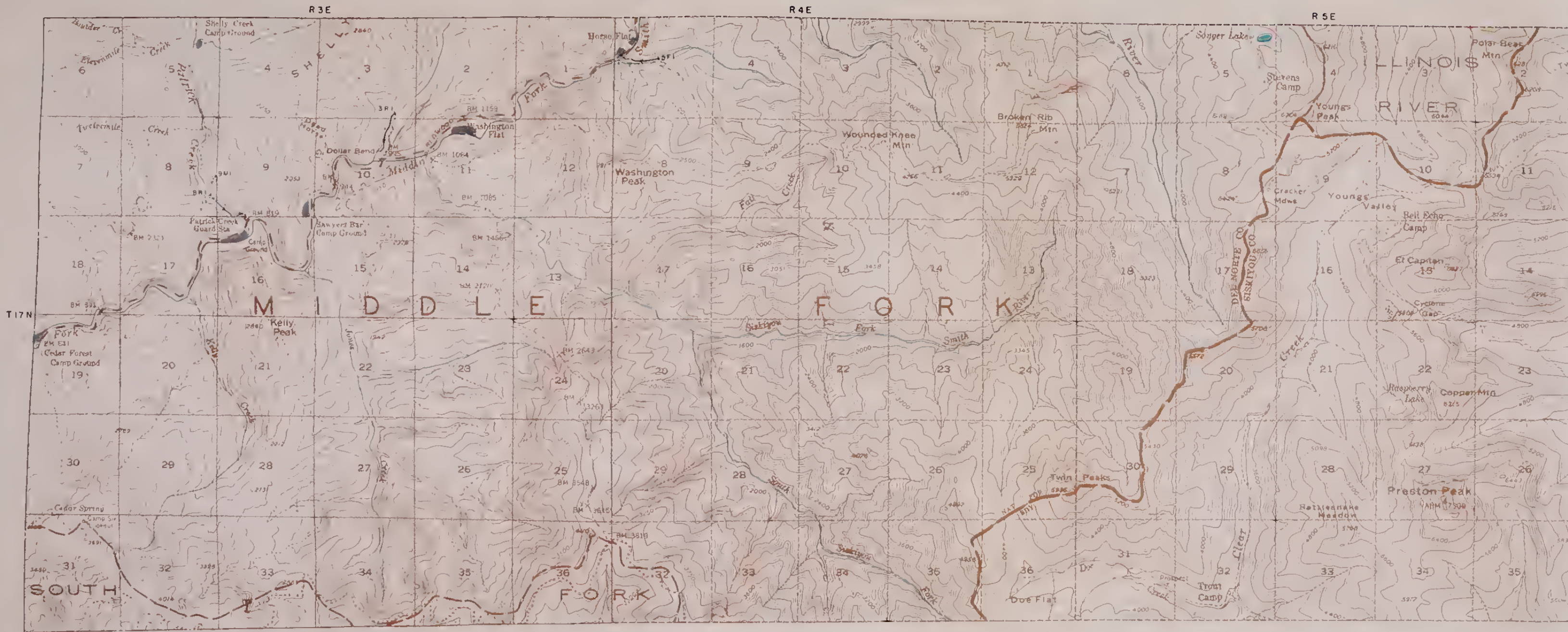
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89202980794122492650204183014619721457664" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
178405961588244985300408366029239442915328" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
356811923176489970600816732058478885830656" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
713623846352979941201633464116957771661312" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
1427247692705959882403266928233915543322624" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
2854495385411919764806533856467831086645248" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
5708990770823839529613067712935662173290496" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
11417981541647679059226135425871324346580992" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
22835963083295358118452270851742648693161984" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
45671926166590716236904541703485297386323968" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
91343852333181432473809083406970594772647936" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
182687704666362864947618166813941189545295872" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
365375409332725729895236333627882379090591648" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
730750818665451459790472667255764758181183296" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
1461501637330902919580945334511529516362366592" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
2923003274661805839161890669023059032724733184" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
5846006549323611678323781338046118065449466368" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
11692013098647223356647562676092236130898932736" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
23384026197294446713295125352184472261797865472" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
46768052394588893426590250704368944523595730944" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
93536104789177786853180501408737889047191461888" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
187072209578355573706361002817475778094382923776" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
374144419156711147412722005634951557887765847552" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
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23945242826029513434414208360632996904881014243328" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
47890485652059026868828416721265993809762028486656" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
95780971304118053737656833442531987619524056973312" LINE	WATER DIVISION	NONE	LANDS OF THE STATE OF CALIFORNIA
1915619426082361074753136668850638523			



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0 1000 2000 3000 4000

DIVERSION UNITS ARE NUMBERED BY
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SECTION BY DIVISION 124. A 1941



- LEGEND**
- CHARITY DIVERSION
 - PUMP DIVERSION
 - DIVERSION CANAL OR DITCH
 - DIVERSION PIPE
 - STREAM GAGING STATION
 - HYDROGRAPHIC UNIT BOUNDARY
 - HYDROGRAPHIC SUBUNIT BOUNDARY

- LANDS RECEIVING FULL IRRIGATION
- LANDS USUALLY IRRIGATED BUT IDLE OR FALLOW IN 1958
- NATURALLY RIPPLED MEADOWLANDS
- DRY-FARMED LANDS
- URBAN LANDS
- RECREATIONAL LANDS

KEY TO NUMBERING SYSTEM

D	C	B	A
E	F	G	H
M	L	K	J
N	P	O	R

DIVERSIONS SHOWN ARE NUMBERED BY TOWNSHIP, RANGE AND SUBDIVISION OF SECTION, eg DIVERSION 16N11W-14R1

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SCALE OF 1"=1' 2000 0 2000 4000 6000



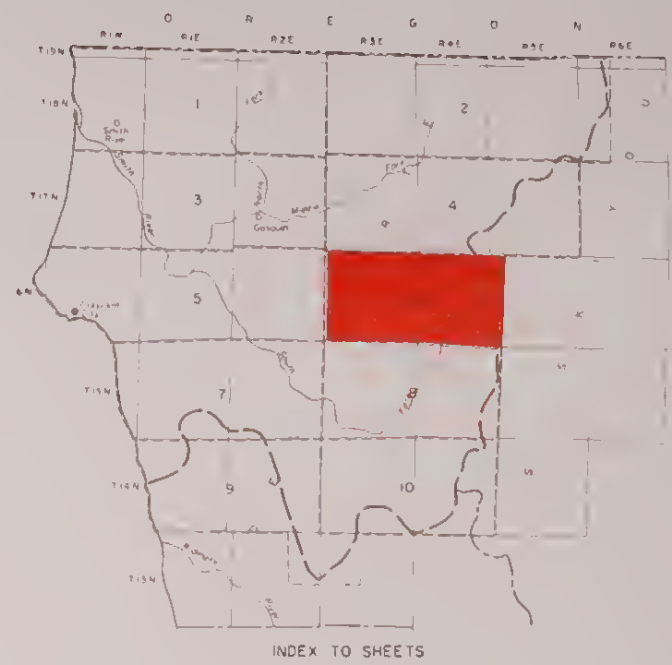
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1042

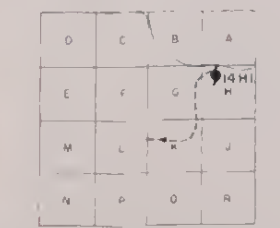
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- LEGEND
- GRAVITY DIVERSION
 - PUMP DIVERSION
 - DIVERSION CANAL OR DITCH
 - DIVERSION PIPE
 - STREAM GAGING STATION
 - HYDROGRAPHIC UNIT BOUNDARY
 - HYDROGRAPHIC SUBUNIT BOUNDARY

- LEGEND
- NONE LANDS RECEIVING FULL IRRIGATION
 - NONE LANDS USUALLY IRRIGATED BUT IDLE OR FALLOW IN 1958
 - NATURALLY IRRIGATED MEADOWLANDS
 - NONE DRY-FARMED LANDS
 - NONE URBAN LANDS
 - NONE RECREATIONAL LANDS

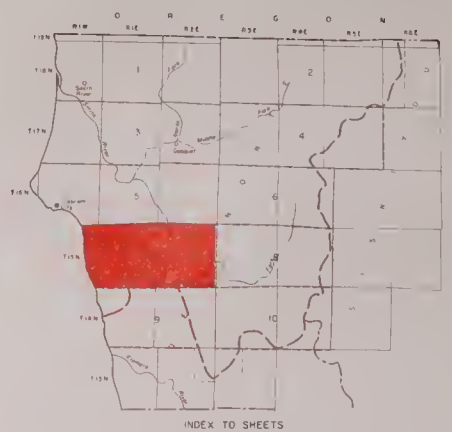
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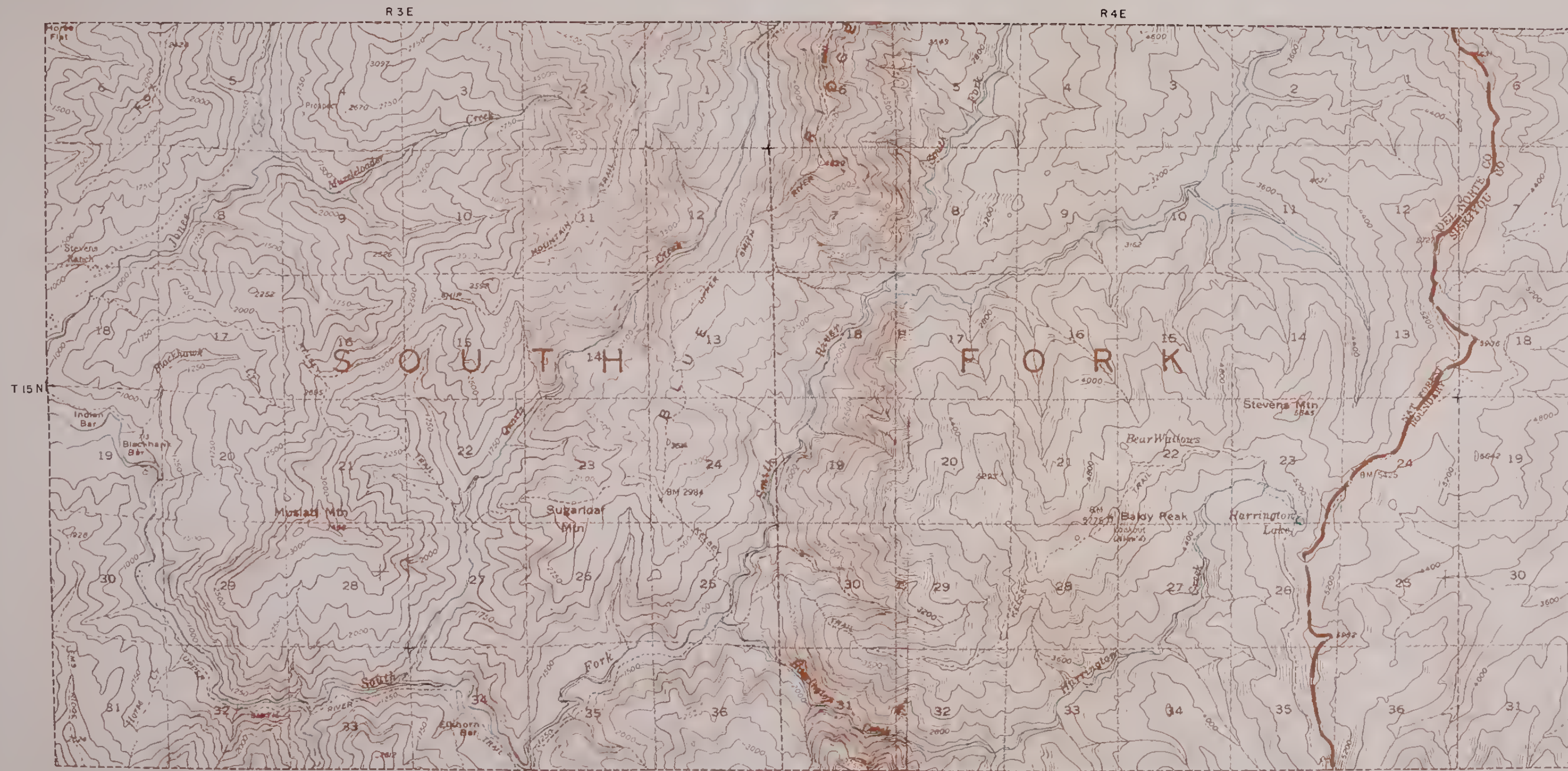


DIVERSIONS SHOWN ARE NUMBERED BY TOWNSHIP, RANGE AND SUBDIVISION OF SECTION, eg DIVERSION 16N/11W-14H

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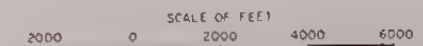
- LEGEND
- 5J1 GRAVITY DIVERSION
 - 14H1 PUMP DIVERSION
 - DIVERSION CANAL OR DITCH
 - DIVERSION PIPE
 - STREAM GAGING STATION
 - HYDROGRAPHIC UNIT BOUNDARY
 - HYDROGRAPHIC SUBUNIT BOUNDARY

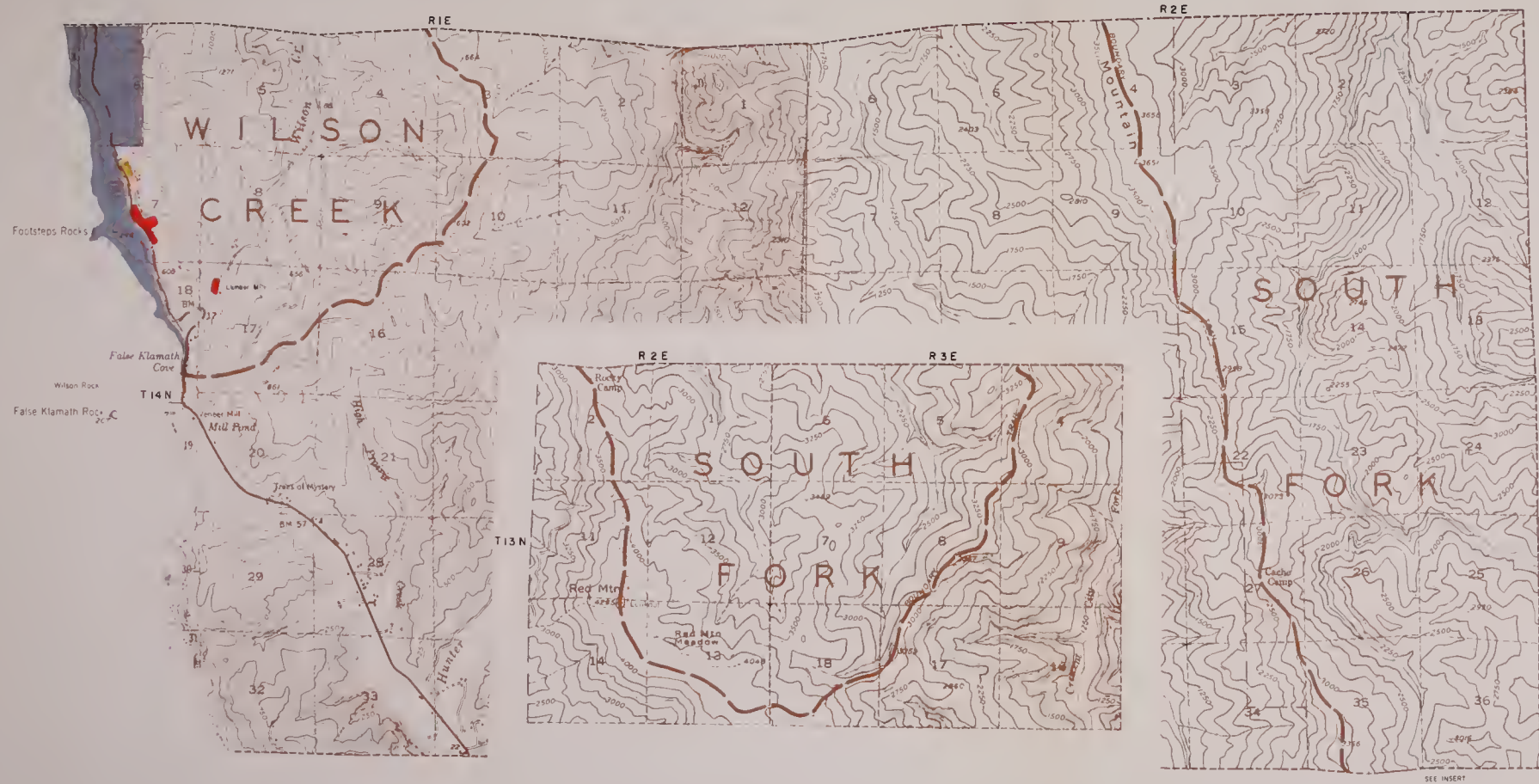
KEY TO NUMBERING SYSTEM



DIVERSIONS SHOWN ARE NUMBERED BY TOWNSHIP, RANGE AND SUBDIVISION OF SECTION, AND DIVERSION 16N/1W-14H1

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- 5.14 GROUND WATERS ON
- 1.01 PUMP DIVERSION
- 1.02 DIVERSION CANAL OR DITCH
- 1.03 DIVERSION PIPE
- 1.04 STREAM GAGING STATION
- 1.05 HYDROGRAPHIC UNIT BOUNDARY
- 1.06 HYDROGRAPHIC SUBUNIT BOUNDARY

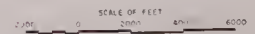
- LEGEND
- NONE LANDS RECEIVING FULL IRRIGATION
 - NONE LANDS USUALLY IRRIGATED BUT IDLE OR FALLOW IN 1958
 - NONE NATURAL & IRRIGATED MEADOWLANDS
 - 1.01 OASIS FARMED LANDS
 - 1.02 URBAN LANDS
 - 1.03 RECREATIONAL LANDS

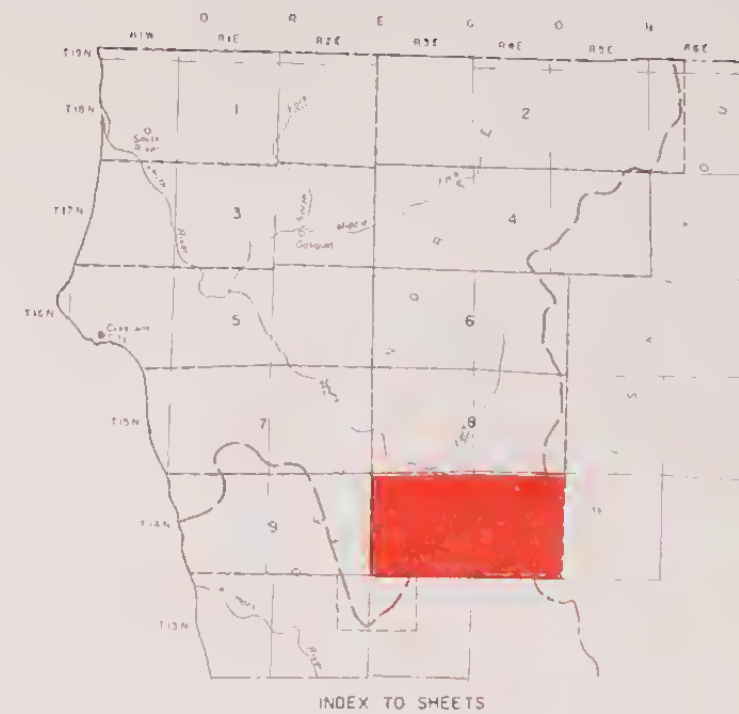
KEY TO NUMBERING SYSTEM



DIVERSIONS SHOWN ARE NUMBERED BY TOWNSHIP, RANGE AND SUBDIVISION OF SECTION, BY DIVERSION NUMBER IN 1958

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- LEGEND**
- GRAVITY DIVERSION
 - PUMP DIVERSION
 - DIVERSION CANAL OR DITCH
 - DIVERSION PIPE
 - STREAM GAGING STATION
 - HYDROGRAPHIC UNIT BOUNDARY
 - HYDROGRAPHIC SUBUNIT BOUNDARY

- LEGEND**
- ☐ NONE LANDS RECEIVING FULL IRRIGATION
 - ☐ NONE LANDS USUALLY IRRIGATED BUT IDLE OR FALLOW IN 1958
 - ☐ NONE NATURALLY IRRIGATED MEADOWLANDS
 - ☐ NONE DRY-FARMED LANDS
 - ☐ NONE URBAN LANDS
 - ☐ NONE RECREATIONAL LANDS

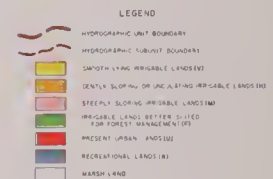
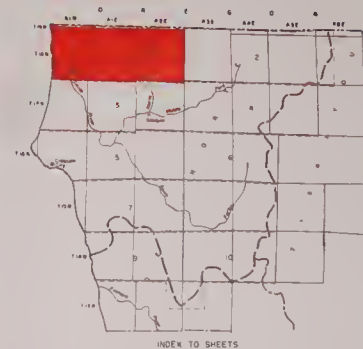
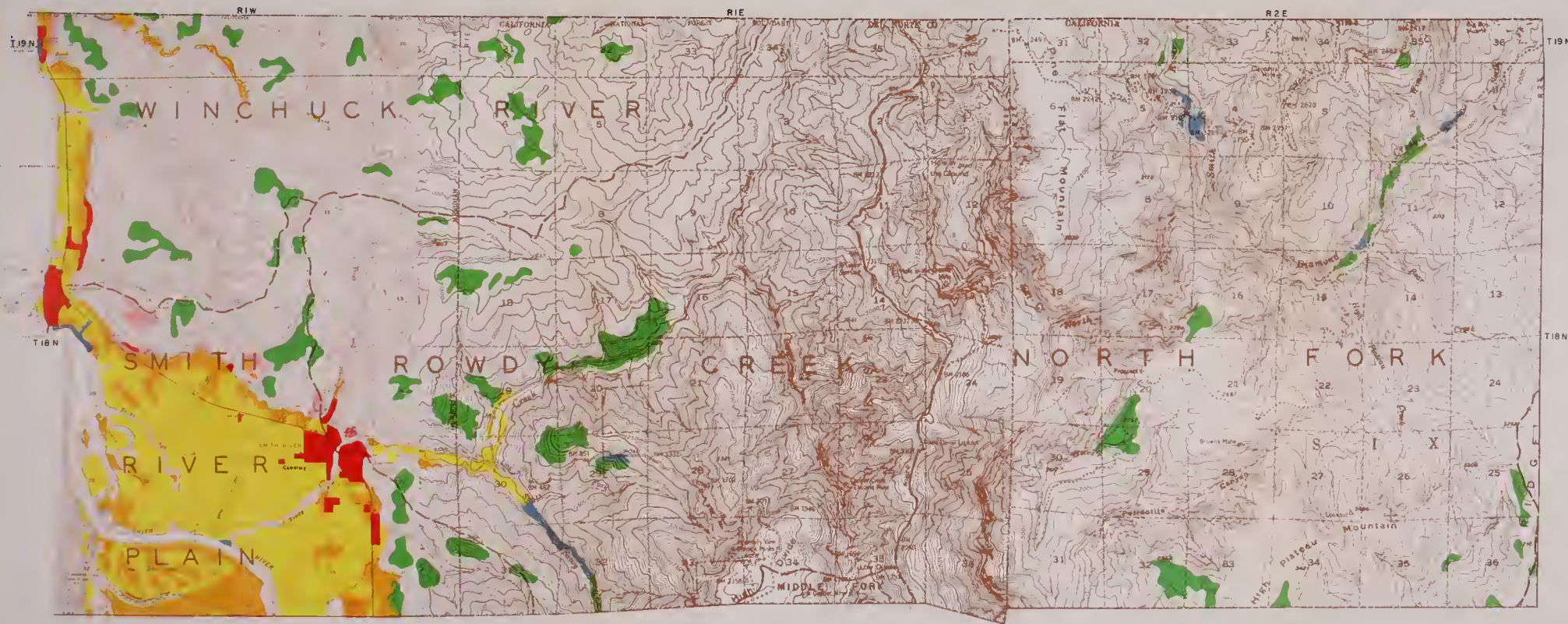
KEY TO NUMBERING SYSTEM



DIVERSIONS SHOWN ARE NUMBERED BY TOWNSHIP, RANGE AND SUBDIVISION OF SECTION, eg DIVERSION 16N/1W-14H1

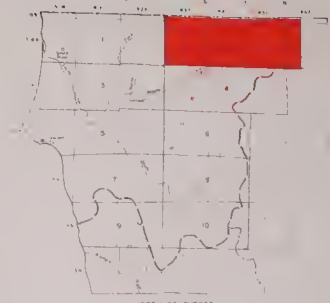
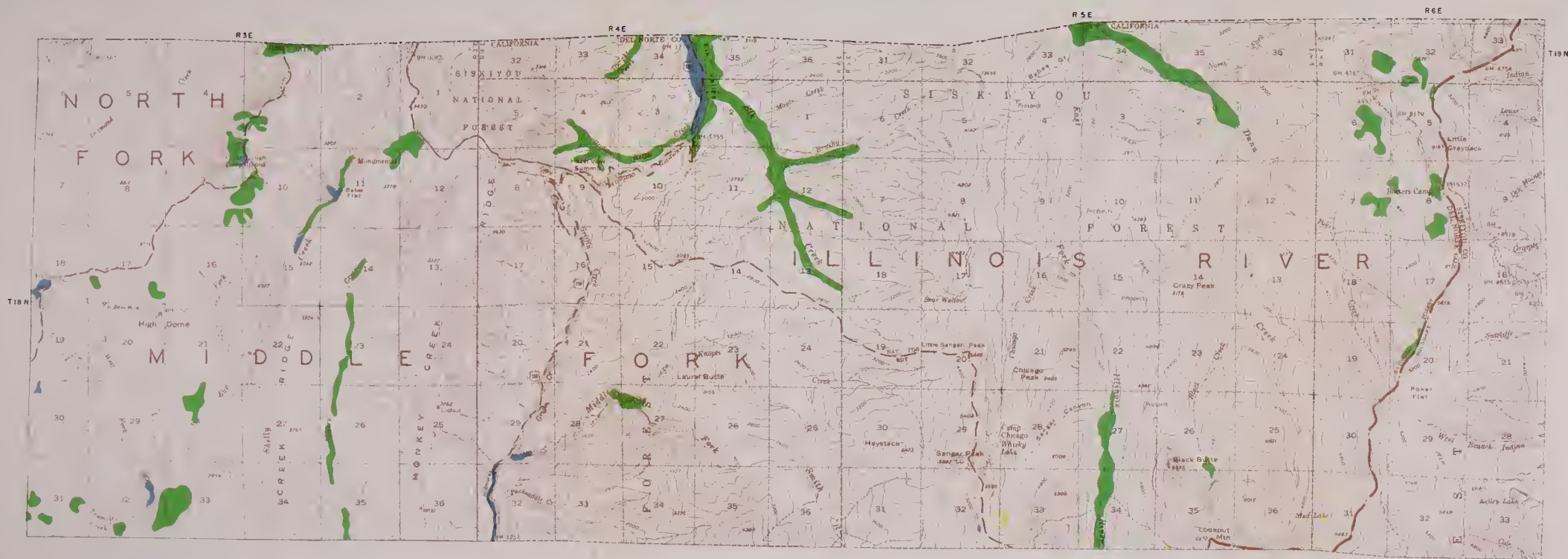
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T18-19 N, R1W-2 E, H&M
1959

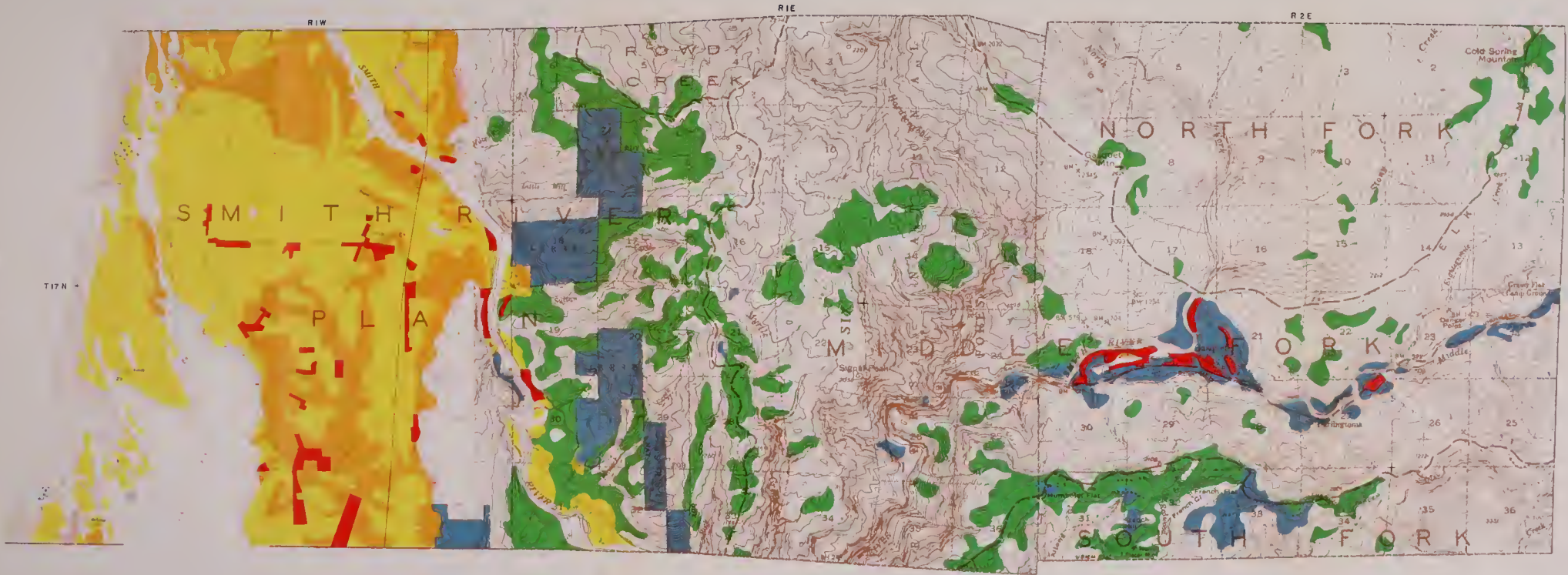
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- LEGEND
- HYDROGRAPHIC UNIT BOUNDARY
 - LAND CLASSIFICATION BOUNDARY
 - LAND CLASSIFICATION
 - FOREST
 - AGRICULTURAL
 - WATER
 - ROAD
 - RAILROAD
 - UNCLASSIFIED

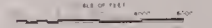
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1959

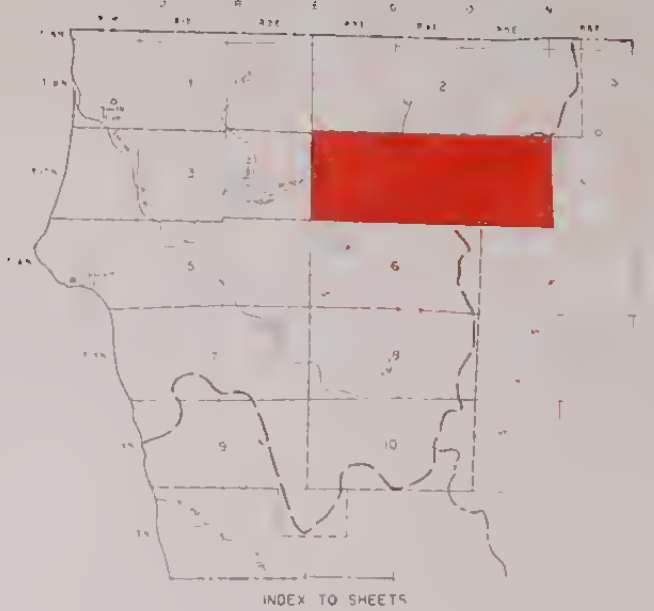
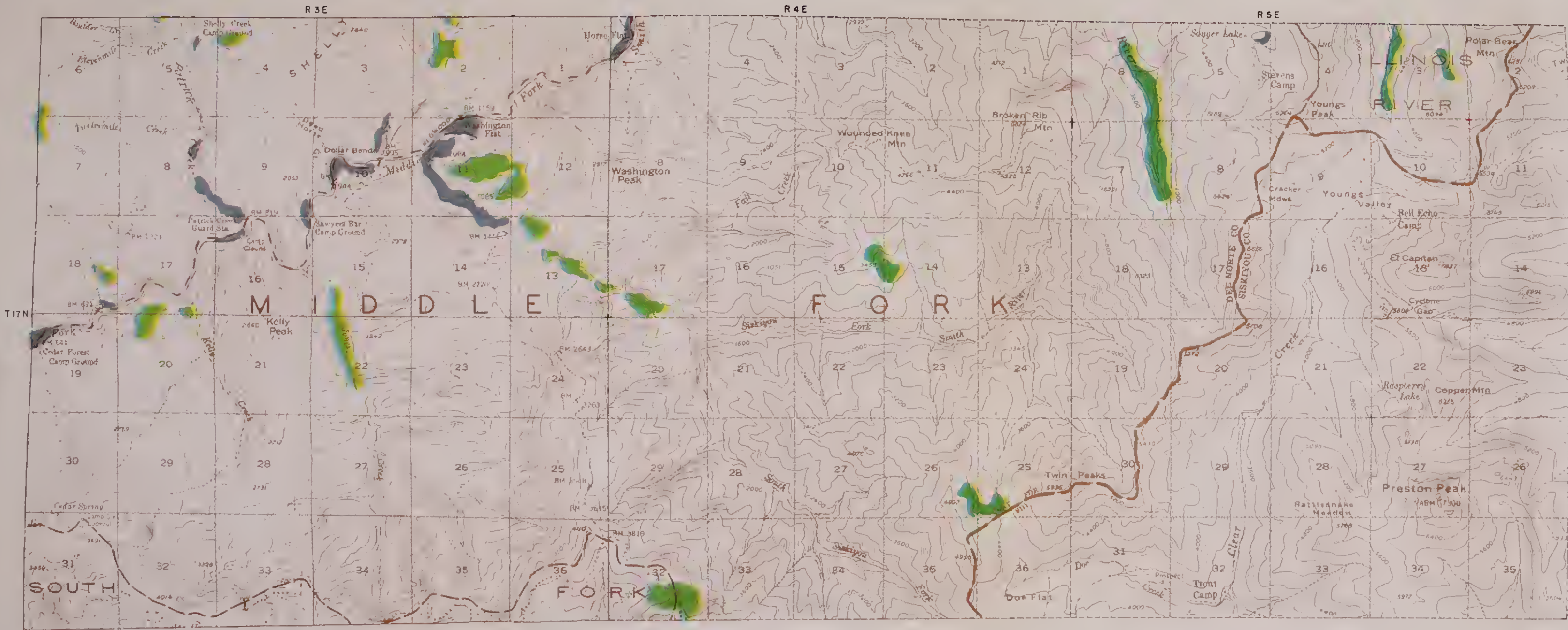
SCALE OF FEET 0 1000 2000 3000 4000 5000



- LEGEND
- WATER (RIVER, LAKE, OCEAN)
 - WATER (RIVER, LAKE, OCEAN) - 100-1000
 - STEPPY (SLOPE 10-20%)
 - ARABLE (AND BOTTLE) - 10-20%
 - PRESENT URBAN - 100-1000
 - RELIEF (HILL, MOUNTAIN)
 - WATER LAND

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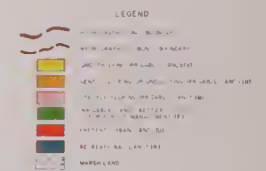
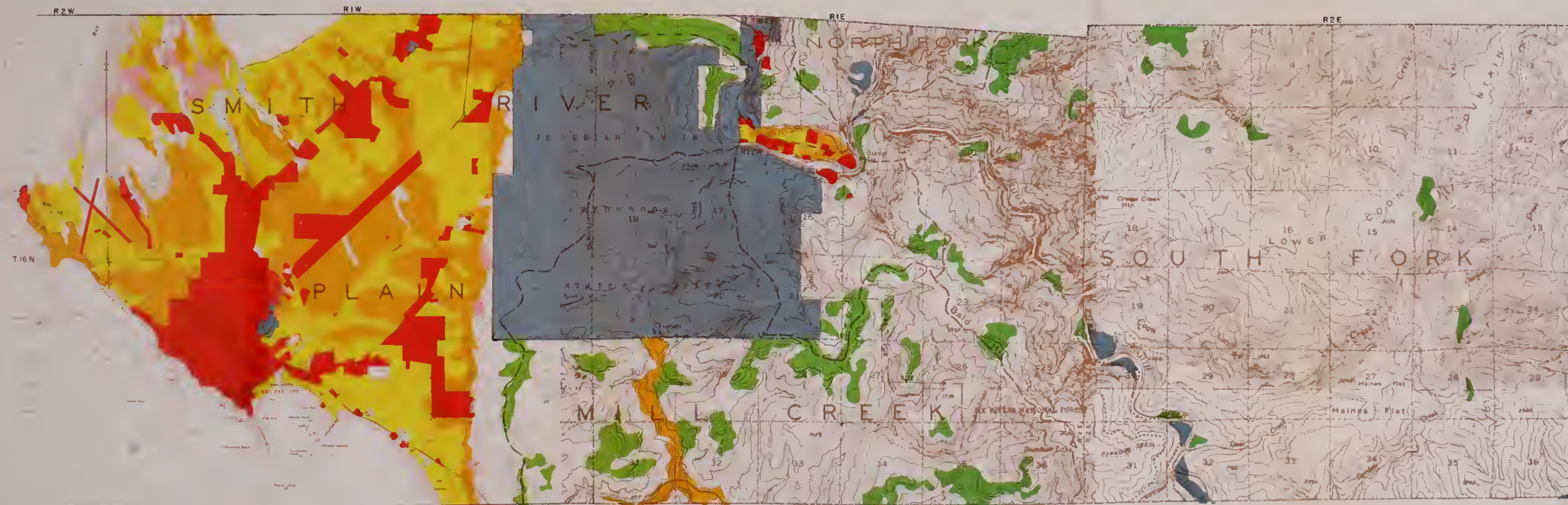


LEGEND

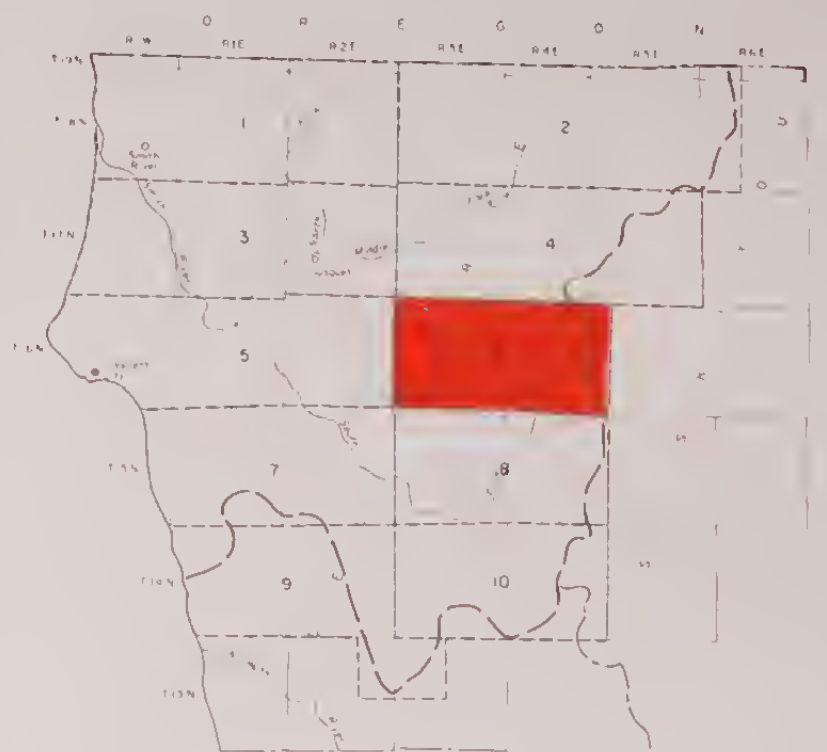
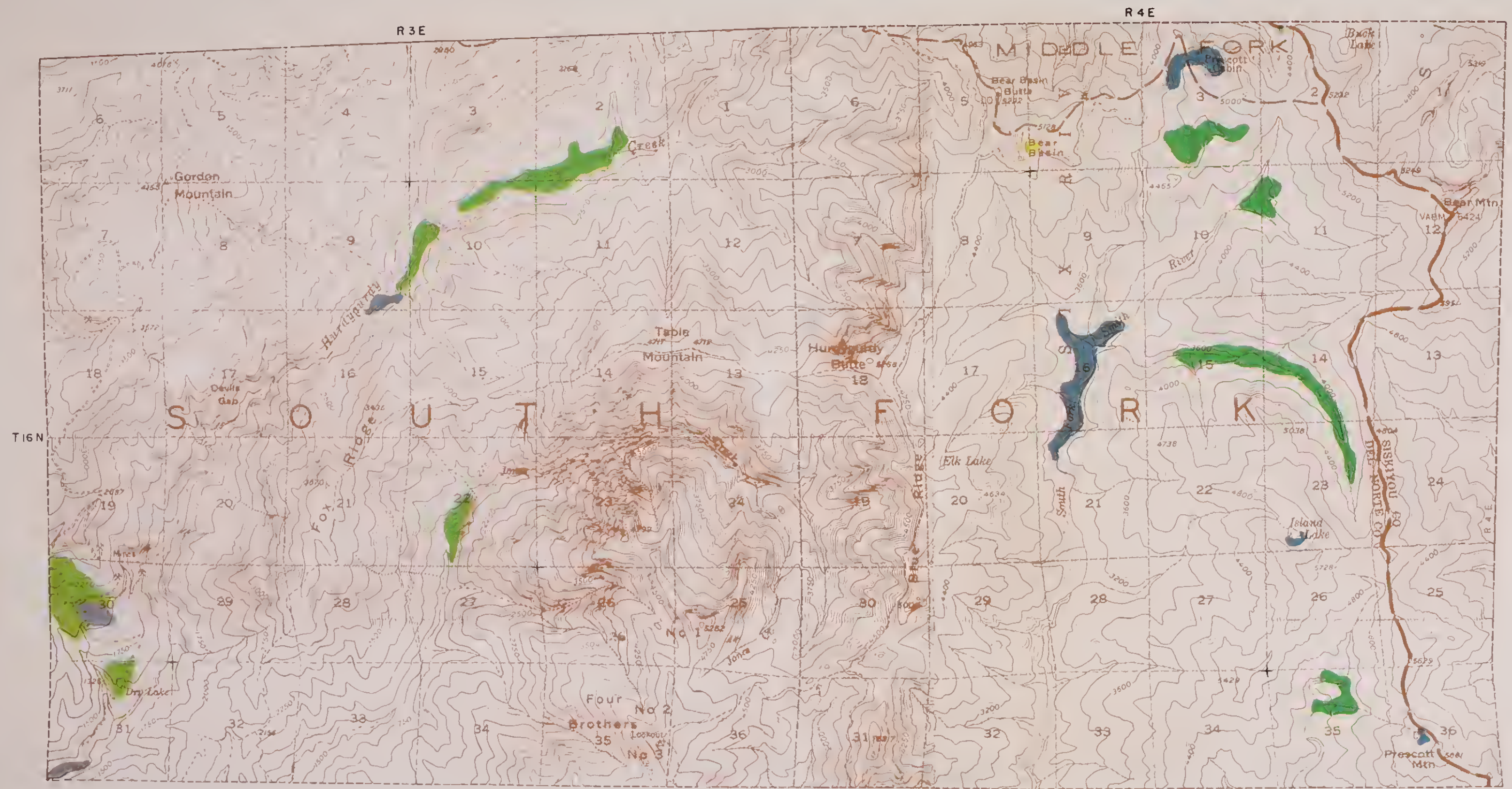
- HYDROGRAPHIC UNIT BOUNDARY
- HYDROGRAPHIC SUBUNIT BOUNDARY
- SMOOTH LIVING IRRIGABLE LANDS (IV)
- GENTLY SLOPING OR UNDULATING IRRIGABLE LANDS (IM)
- STEELY SLOPING IRRIGABLE LANDS (IM)
- IRRIGABLE LANDS BETTER SUITED FOR FOREST MANAGEMENT (IF)
- PRESENT URBAN LANDS (UI)
- RECREATIONAL LANDS (RI)

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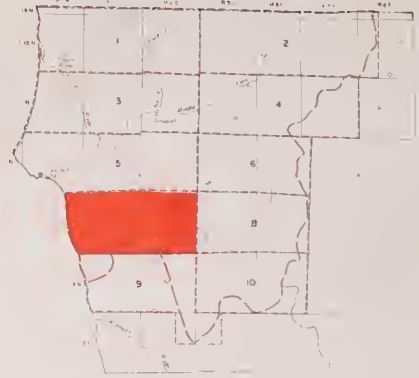
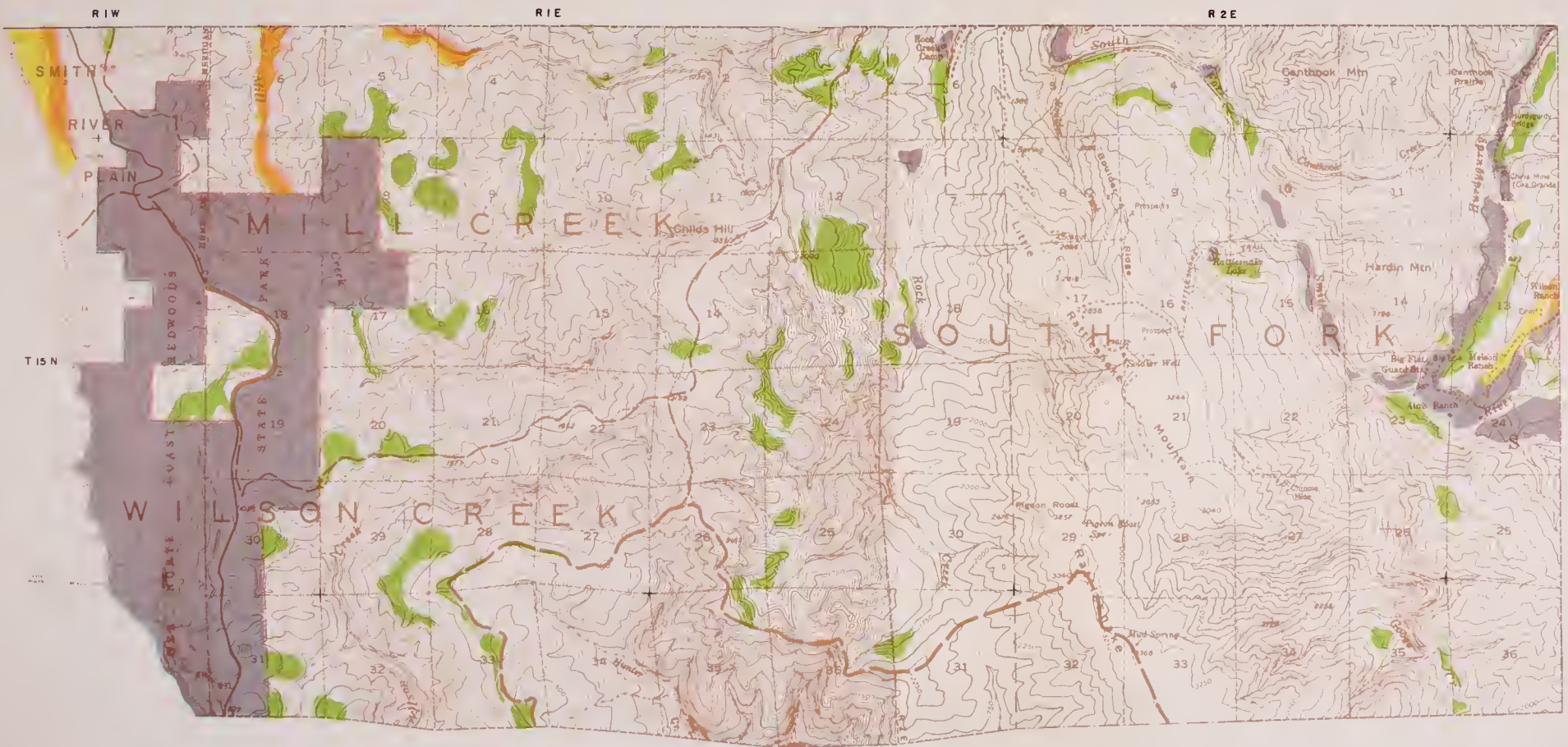
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 - SMOOTH LYING IRRIGABLE LANDS (V)
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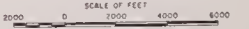


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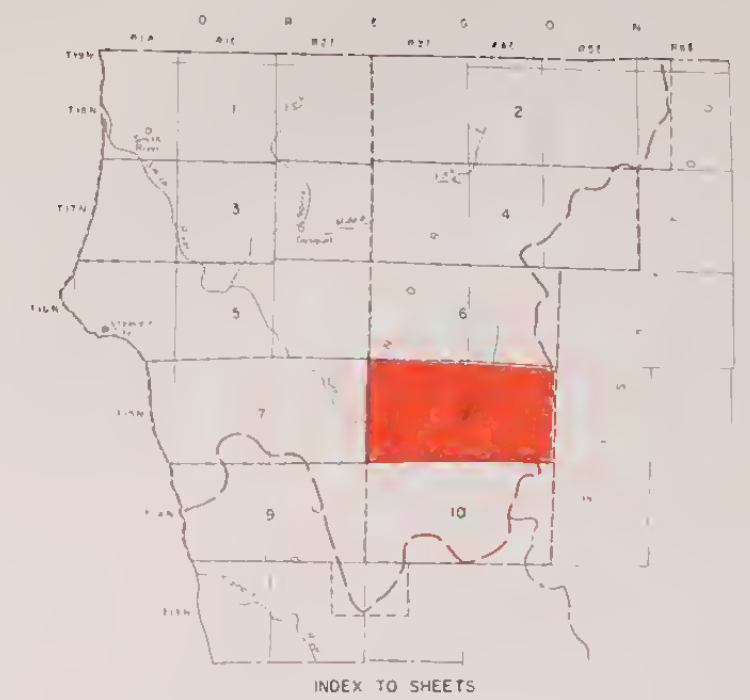
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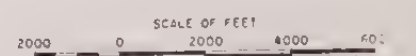
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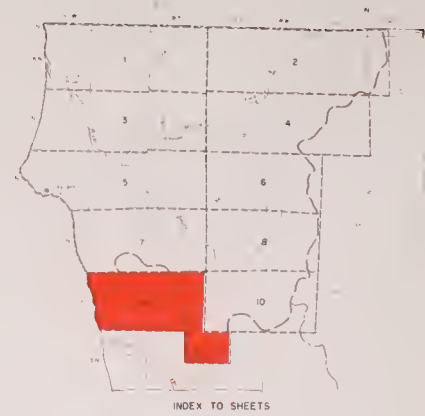
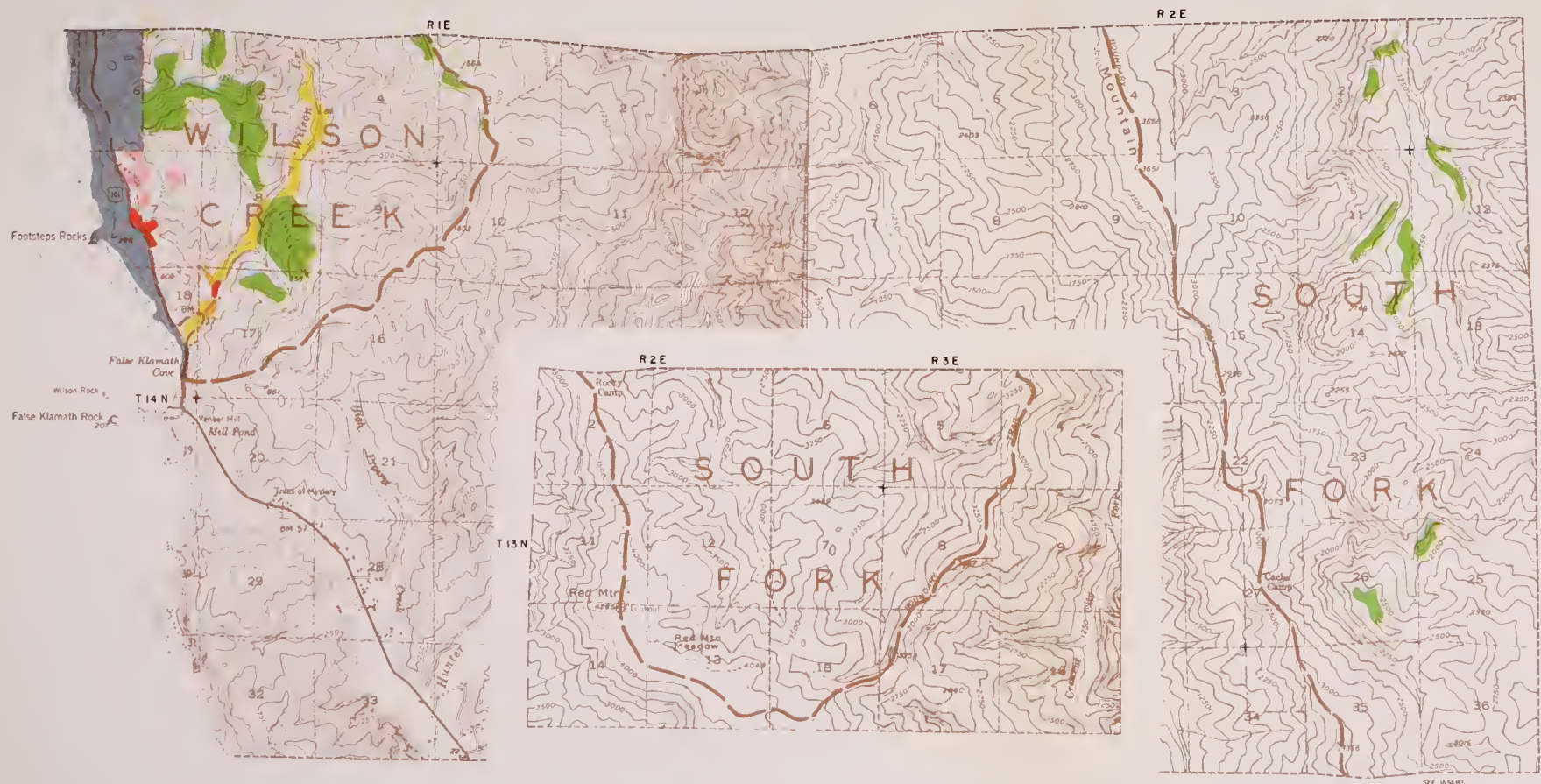
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